Department of Biomedical Sciences
School of Public Health
University at Albany

Graduate Program of Study

August 2011

Department of Biomedical Sciences Directory

Department Chair
M. Joan Curcio. PhD
Center for Medical Science, Room 5225
150 New Scotland Avenue
Albany, NY 12208
518-473-6078
curcio@wadsworth.org

Associate Chair
Janice Pata, PhD
Center for Medical Science, Room 2007
150 New Scotland Avenue
Albany, NY 12208
518-402-2595
jpata@wadsworth.org

Graduate Program Administrator
Anthony Torres
Center for Medical Science, Room 5200
150 New Scotland Avenue
Albany, NY 12208
518-402-2510
axt12@wadsworth.org

Track Coordinators

Immunology and Infectious Diseases Track
William Lee, PhD
David Axelrod Institute, Room 5080
120 New Scotland Avenue
Albany, NY 12208
518-473-3543
leew@wadsworth.org

Kathleen McDonough, PhD
David Axelrod Institute, Room 4112
120 New Scotland Avenue
Albany, NY 12208
518-486-4253
mcdonoug@wadsworth.org

Molecular Genetics Track
Douglas Conklin, PhD
Cancer Research Center, Room 204
East Campus, One Discovery Drive
Rensselear, NY 12144
518-591-7154
dconklin@albany.edu

Neuroscience Track
Valerie Bolivar, PhD
Center for Medical Science, Room 5342
150 New Scotland Avenue
Albany, NY 12208
518-473-2207
bolivar@wadsworth.org

Structural and Cell Biology Track
Joachim Jaeger, PhD
Center for Medical Science, Room 2008
150 New Scotland Avenue
Albany, NY 12208
518-408-2225
jj@wadsworth.org

Training Program Directors

Biodefense and Emerging Infectious Disease Program Director
Kathleen McDonough, PhD
David Axelrod Institute, Room 4112
120 New Scotland Avenue
Albany, NY 12208
518-486-4253
mcdonoug@wadsworth.org

FlexEBio IGERT Training Program Director
Gerwin Schalk, PhD
Wadsworth Center, Room 650-A
Empire State Plaza
Albany, NY 12201
518-486-2559
schalk@wadsworth.org

DEPARTMENT OF BIOMEDICAL SCIENCES

School of Public Health, University at Albany

The Department of Biomedical Sciences comprises the following tracks and training programs:

Immunology and Infectious Diseases (IID)
Molecular Genetics (MG)
Neuroscience (NEU)
Structural and Cell Biology (SCB)
Biodefense and Emerging Infectious Disease Training Program (BDEID)
Flexible Electronics for Biological and Life Science Applications (FlexEBio IGERT)

Applicants to either the MS or PhD program are expected to hold a baccalaureate with a combined total of at least 42 credits in biology, chemistry, mathematics, or physics. Typical applicants have an undergraduate degree in either the biological, chemical, or physical sciences, or they have a demonstrated proficiency in these areas as well as mathematics from a recognized college or university. Applicants are required to submit official scores of the Graduate Record Examination aptitude test; the advanced test in biology, chemistry, or physics is recommended. A minimum score of 600 on the paper based TOEFL (250 on the computerized test; 100 on the internet based test) is required for international students.

The graduate program in Biomedical Sciences (BMS) is individualized. Courses are selected with the assistance of faculty advisors, in accordance with the requirements of the tracks and taking into account the background and interests of the individual student. Students may be admitted for study toward either the PhD or MS degree.

During the first two years all students Take BMS 500 Molecular Cell Biology; BMS 502 Macromolecular Structure; BMS 590 Laboratory Rotations in Biomedical Science; BMS 665 Current Literature; BMS 601 Introduction to Biomedical Sciences; and BMS 670 Responsible Conduct of Scientific Research. Elective course are available in areas such as molecular biology, genetics, immunology, infectious disease, structural biology, and neuroscience.

The laboratory rotations course (BMS 590) is taken in the first semester by all students, regardless of their previous laboratory experience. The aims of the laboratory rotations are: (1) to allow the student to interact with faculty from varied disciplines, (2) to introduce the student to laboratory techniques and principles, and (3) to aid the student in selecting a mentor for their graduate research. All students complete a minimum of two rotations under two different mentors.

BMS 601 is a multi-disciplinary introduction to fundamental principles of the biomedical sciences focusing on the molecular basis of human disease. The course integrates basic sciences and genomic-scale technology with human health, environmental induced

disease and public health. Students will also gain an understanding of how bench science leads to improvements in public health and become familiar with grant writing and scientific paper presentation and review.

BMS 670 is aimed at promoting a better recognition of the values underlying the ethical performance of science. Case studies on topics such as data management; authorship; peer review; conflict of interest; use of animals in research; human subjects in research; and policies on misconduct will be discussed.

In addition to formal course work, emphasis is placed on informal instruction and interaction between students and faculty in the laboratory, and active participation in seminars, colloquia, journal clubs, and Breakfast Club. It is expected that students in both the MS and PhD programs will select a mentor and a track by the end of the first semester. PhD students are expected to be admitted to candidacy for the doctoral degree by the end of the third year.

Students in the Department of Biomedical Sciences can choose their course of study from the following areas of research:

Immunology and Infectious Diseases

The study of the basic biology and pathogenesis of viruses, bacteria, fungi, and protozoan pathogens, their interaction with host cells at the cellular and molecular level, and the response of the immune system to these microbes. Scientists in this track utilize structural biology, biochemistry, molecular biology, cell biology, arthropod biology, ecology, evolution, and genetics to investigate the problems of infectious diseases and immune-related pathologies.

Molecular Genetics

The study of the structure and function of genes and genomes at a molecular level. Faculty in the Molecular Genetics Track focus on the genetics of humans, model organisms from *E. coli* to mice, and viral and bacterial pathogens. Faculty research encompasses genomics, population genetics, quantitative genetics, cancer genetics, developmental genetics, gene expression, gene regulation and genome biology and evolution.

Neuroscience

The study of basic biological principles underlying nervous system functions and their application to disease. Neuroscience faculty members study problems ranging from understanding the molecular basis of neurodegenerative and neuropsychiatric disease to developing effective therapies, including workable computer-brain interfaces. Subspecialization may be pursued in neurogenetics, neurophysiology, neuroimmunology, neuroanatomy, and neurotoxicology. Scientists in this track collaborate extensively with those in other BMS tracks, as well as with researchers and physicians in area hospitals.

Structural and Cell Biology

The study of the macromolecular structures and molecular machines, using advanced 3D light and electron microscopy, X-ray crystallography, NMR spectroscopy, molecular modeling and virtual screening. The emphasis is on understanding cellular function, the assembly of integrated molecular machines, and structural or molecular aspects of human disease. Topics include replication, transcription and translation; molecular recognition and complex formation; cell division; and how defects in the cellular machinery can lead to cancer and other important diseases. Questions addressed include: how are molecular machines assembled, how do they function (or malfunction), and how are they regulated?

Biodefense and Emerging Infectious Disease Training Program

The BDEID training program bridges basic biomedical research and public health with emphasis on the fundamentals of infectious disease and immunology. Practical training is offered in epidemiology, emerging infections, and biodefense science in biocontainment laboratories. Program faculty focus on the areas of pathogen biology and determinants of pathogenesis; animal models of infection and immunity; host response and immunity, epidemiology; natural history and ecology of select agents and diseases; novel therapeutic targets; and development of diagnostic methodologies. Trainees will be broadly trained to address the challenges associated with understanding the causes of infectious disease.

Flexible Electronics for Biological and Life Science Applications IGERT Training Program

The NSF-sponsored Integrative Graduate Education & Research Training (IGERT) Program is a partnership with Cornell University, Binghamton University, and the Wadsworth Center. The goals of this program are to promote interdisciplinary research in fundamental biological and physical sciences and training in innovative team-based science and technology. Primary research themes focus on improving neural prosthetics and brain computer interfaces through the study of biological interfaces with newly developed flexible neural electrode arrays.

***

The course of study of each student is planned with a faculty advisor who takes into account the student's previous preparation; area of specialization, and professional objectives. Students should refer to the Program of Study worksheets included in this booklet to identify the curriculum appropriate to their area of concentration.

The following courses may be taken by any student, in consultation with the academic mentor.

BMS 506 Introduction to Immunology	2cr
BMS 514 Cellular and Molecular Immunology	3cr
BMS 552 Medical Entomology	3cr
BMS 553 Virology	4cr
BMS 555 Biodefense Sciences	1cr
BMS 556 Biodefense Laboratory	1cr
BMS 557 Emerging Infectious Diseases	1cr
BMS 604 Cellular and Molecular Neuroscience	3cr
BMS 606 Biology of Model Organisms	3cr
BMS 610 Microbial Pathogenesis	3cr
BMS 612 Neuroanatomy and Nervous System Disorders	3cr
BMS 622 Cancer Biology	3cr
BMS 632 Molecular and Cellular Biology of Prokaryotes	3cr
BMS 635 Introduction to Structural Molecular Biology	3cr
BMS 652 Neuroimmunology Colloquium	2cr
BMS 655 NanoBioTechnology	3cr
BMS 660 Readings in Molecular Endocrinology	3cr
BMS 622 Student Seminars in Biomedical Sciences	2cr
BMS 663 Mammalian Molecular Genetics	3cr
BMS 666 Contemporary Topics in Immunology	0-1cr
BMS 894 Directed Readings in Biomedical Sciences	1-6cr
EPI 551 Basic Principles of Statistical Inference	3cr

Students may take classes offered in other departments at the University at Albany. Students also have the option of cross registering for graduate level courses at Albany Medical College, Rensselaer Polytechnic Institute and other local colleges. For information on the cross registration process, visit http://www.albany.edu/gradstudies/resfac_crossregistration.shtml.

ACADEMIC STANDARDS

All students are expected to remain in good academic standing during the course of their study, i.e. maintain at least a B average and obtain a grade of satisfactory (S) in all credit requirements applicable to the graduate degree. A student whose record falls below these standards will, at the discretion of the Department, either be placed on probation or dismissed. Students on probation are conditionally allowed to continue in the department program for a limited time period in order to achieve good academic standing and are expected to obtain at least a B or S grade in all of their courses. A student whose record falls below acceptable standards or whose
performance otherwise indicates a lack of ability or effort needed to succeed in the graduate program may at any time be denied permission for further study.

PROBATION

Students on probation are conditionally allowed to continue in the program for a limited period of time in order to correct a deficiency in their record (eg grade problem, failure to complete qualifying exams or admission to candidacy requirements in a timely manner, etc.). The probationary period usually lasts for at least one semester and, depending upon the student's progress, may be extended for up to one year. All deficiencies must be corrected before probation ends. A student on probation may have their University stipend and/or tuition scholarship withdrawn at any time.

ACADEMIC INTEGRITY

Academic dishonesty (e.g. plagiarism, cheating on examinations, falsification of data, etc) is unacceptable and will not be tolerated. Any student who violates academic integrity standards will automatically be placed on disciplinary probation for at least one semester. For violations associated with a course, the student may be required to retake the course at his/her own expense. Depending on the severity of the violation, the student's stipend and /or tuition may also be revoked, or the student dismissed from the program. A report describing the violation and recommended sanctions imposed will be placed in the student's file, and a copy of the form will be distributed to the student's mentor and thesis committee members, the Dean of the School of Public Health, and the Office of Graduate Studies.

University policy states the following:

> "If a faculty member informs the student that he or she will receive a failing grade in the course or other academic exercise as a result of academic dishonesty, the student receiving such penalty will not be permitted to withdraw from the course unless the grievance process or Office of Conflict Resolution and Civic Responsibility rules in favor of the student. Students who feel they have been erroneously penalized for an academic integrity infraction or who think that a penalty is inappropriate may grieve these issues through procedures developed for each college, school, program, or department of the University. Copies of the

> procedures are maintained in the School and College Deans' Offices or on their respective websites. A copy of the disposition of any grievance arising in matters of academic dishonesty will be attached to the Violation of Academic Integrity Report filed in the Office of the Vice Provost for Undergraduate Education or the Dean of Graduate Studies."

Detailed information on the University's definitions and policies on academic dishonesty can be found in *Community Rights and Responsibilities*, a University at Albany publication, found online at http://www.albany.edu/judicial/conduct.shtml.

CODE OF CONDUCT

The Department of Biomedical Sciences expects that all students will understand and adhere to the University at Albany Code of Conduct as detailed in the *Community Rights and Responsibilities* handbook (http://www.albany.edu/studentconduct/index.shtml). The *Community Rights and Responsibilities* handbook states the following:

> "*Community Rights and Responsibilities* is the official code of conduct for students outlining the expectations to which all our students are held. The University has formulated this code of standards and expectations, consistent with its purpose as an educational institution. These regulations and the procedures for their enforcement apply to all student conduct and behavior. Students should become familiar with this document, as it is important to understand that the freedom that is afforded to you as a member of this community comes with an associated responsibility."
> (http://www.albany.edu/studentconduct/introduction.shtml).

REASONABLE ACCOMODATIONS

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 137, 442-5490) at the start of the semester. That office will provide course instructor(s) with verification of your disability, and will recommend appropriate accommodations. More information can be found at: http://www.albany.edu/disability/index.shtml .

PROGRAM LEADING TO THE MASTER OF SCIENCE (MS) DEGREE

Program of Study and Research (36 credits minimum)

The course of study for the MS degree should take 2 years to complete beyond the baccalaureate.

1. **Required Courses**
    1) BMS 500: Molecular Biology (4 credits)
    2) BMS 502: Macromolecular Structure and Function (4 credits)
    3) BMS 590: Lab Rotations (1 credit) *
    4) BMS 601 - Introduction to Biomedical Sciences (3 credits)
    5) BMS 665: Journal Club (participation begins in spring semester; must be taken every semester thereafter for 0 or 1 credit; can be taken for credit a maximum of 2 times)
    6) BMS 670: Responsible Conduct of Scientific Research (1 credit)

* *Each rotation will require a minimum of 10 hours per week in the laboratory. Satisfactory completion of a rotation will consist of a written report and evaluation of a lab notebook. All students are encouraged to have selected a research mentor by the beginning of the spring semester. If a student has not chosen a mentor by the beginning of the spring semester, a 3rd and 4th rotation may be completed.*

2. **Additional courses** as approved by advisor. Total course credits to equal 22 course credits minimum.

3. Master's **thesis research** (BMS 699: 14 credits minimum).

4. Satisfactory completion of a Master's **major field examination**. This oral exam will be administered by a three member thesis advisory and examination committee consisting of the student's mentor and two additional faculty members, one in the student's track and one in the department, but outside of the student's track. The subject matter of this exam should be in the area of the student's proposed research. The exam will be taken no later than the semester prior to the defense of thesis, and may be retaken once.

5. Satisfactory completion of a **written thesis**. The thesis has no page limitation and must present specific aims, background and significance, experimental designs and methods section, results section, discussion, conclusion, and references. The thesis is reviewed by the Masters Thesis committee, who will determine if the student understands the work done, interprets the results objectively, and can communicate the science effectively.

6. Satisfactory **defense of thesis**. The candidate will present an open oral seminar based on thesis research and defend his/her work in a closed meeting of the thesis committee.

7. Candidates must maintain a minimum of a **B average**.

< *If a student gets a C+ or lower in a departmental required course, he/she must retake the course.*

Students are encouraged to take the "Communication in Science" workshop that is offered annually (beginning in the fall of 2012) and is designed to promote effective scientific writing and data presentation skills. The workshop focuses on writing journal articles, presenting posters, and giving oral presentations on graduate research.

Program of Study – Masters Degree

Department Requirements (14 minimum to 15 maximum credits)	**Credits**	**Grade**	**Semester Offered / Semester Completed**
BMS 500: Molecular Biology	4		Fall – Year 1
BMS 502: Macromolecular Structure & Function	4		Fall – Year 1
BMS 590: Laboratory Rotations	1		Fall – Year 1
BMS 601: Introduction to Biomedical Sciences	3		Fall – Year 2
BMS 665: Journal Club (0/1)	1-2		Start Spring Year 1
BMS 670: Responsible Conduct of Research	1		Fall/Spring
Electives (7 - 8 credits)			
Elective 1			
Elective 2			
Elective 3			
Transfer credits			
Total course credits required = 22			
BMS 699: MS Thesis Research Credits (14 total required)			
Communication in Science Workshop	0		

Mentor Approval Form submitted: _____
(date)

Thesis Committee formed: _____
(date)

Major Field Exam: _____
(date)

PROGRAM LEADING TO THE DOCTOR OF PHILOSOPHY DEGREE (PhD)

The program of study and research toward the PhD degree requires at least three academic years of full-time study and research beyond the baccalaureate, and typically involves five years of full-time study.

Course Requirements (66 credits minimum)

1. **Required courses**
    1) BMS 500: Molecular Biology (4 credits)
    2) BMS 502: Macromolecular Structure and Function (4 credits)
    3) BMS 590: Laboratory rotations (1 or 2 credits) *
    4) BMS 601 - Introduction to Biomedical Sciences (3 credits)
    5) BMS 665 - Journal Club (participation begins in spring semester; must be taken every semester thereafter for 0 or 1 credit; maximum of 4 credits total) **
    6) BMS 670 - Responsible Conduct of Scientific Research (1 credit)

* *2 rotations are required of doctoral students. Each rotation will require a minimum of 10 hours per week in the laboratory. Satisfactory completion of a rotation will consist of a written report and evaluation of a lab notebook. All students are encouraged to have selected a research mentor by the beginning of the spring semester. If a student has not chosen a mentor by the beginning of the spring semester, a 3rd and 4th rotation may be completed.*

** *First year doctoral students will participate in BMS 665 QEI Journal Club during the spring semester and then in sections appropriate to their laboratory research in following semesters.*

2. **Additional courses** as approved by advisor or required by track. Total course credits to equal 38 credits minimum.

3. **Dissertation Research** BMS898 and BMS899: 28 credits minimum combined. BMS 898 is taken by students not yet admitted into candidacy for the degree; BMS 899 is required of all students admitted into candidacy for the degree.

4. **Admission to Candidacy:** Students must be admitted to candidacy by the end of their third year of study. A student is admitted to candidacy for the degree of Doctor of Philosophy upon meeting the following standards:

    1. A minimum of a B average *
    2. Satisfactory record in course and seminar study requirements, 38 credits minimum
    3. Satisfactory completion of the research tool requirement
    4. Satisfactory completion of both parts of the Qualifying Exam
    5. Completion of University residence requirement, minimum of 7 credits per semester for 2 semesters.

** If a student gets a C+ or lower in a departmental required course, he/she must retake the course.*

Students are encouraged to take the "Communication in Science" workshop that is offered annually (beginning in the fall of 2012) and is designed to promote effective scientific writing and data presentation skills. The workshop focuses on writing journal articles, presenting posters, and giving oral presentations on graduate research. This workshop can be used to satisfy the "Research Tool Requirement" described below.

TUITION POLICY

Doctoral students are eligible to receive tuition scholarships for a period of four years. Students must be admitted into candidacy by the end of their third year of study, and are expected to complete the 66 credits required for the degree by the end of their fourth year. Contingent upon available funding, tuition scholarships may be provided at the rate of one (1) credit per semester to students in their fifth year of study. Students in their 6th year of study or beyond are not eligible to receive a tuition scholarship.

RESEARCH TOOL REQUIREMENT

The student must demonstrate proficiency in an approved research tool. This can be accomplished by demonstrating a reading knowledge of one appropriate foreign language or competency in computer science, statistical analysis, or biometrics. Alternatives may include appropriate courses which will not be used toward degree credit.

Students must submit a written request to the Department as to their choice to satisfy the research tool requirement. This request must be submitted to and approved by the Graduate Academic Committee **BEFORE** the start of the proposed tool.

Examples of Research Tools may include:

- Formal approved courses (a minimum of a B grade) selected from the list below:
  - EPI 551 Basic Principles of Statistical Inference
  - MAT 565 Applied Statistics
  - CSI 580 Computer Science in Scientific Disciplines
  - CSI 503 Algorithms and Data Structures
  - (*Additional courses may be approved upon review by the GAC)*
- Computer knowledge - satisfied by writing a functional program on an appropriate problem)
- Technique Workshops (ie Light Microscopy; Crystallography) - satisfied through completion of project
- Foreign Language - written translation of a scientific paper
- The "Communications in Science" workshop offered by the department

PhD QUALIFYING EXAM: PARTS I AND II

Part I: The Comprehensive Exam. This is an oral exam taken at the end of May in the first year of study. It is intended to test the candidate's breadth of knowledge in the Biomedical Sciences, to determine whether the student can apply that knowledge to experimental hypotheses, and to test his/her ability to critique a scientific paper. The candidate will choose one of four papers selected by the examining committee. The papers will be representative of the four general track areas and will draw upon material covered in the first year courses. Students will be presented with the papers two weeks prior to the exam and will notify the QE1 committee of their choice of paper one week before the exam. In preparing for this exam, students are not permitted to consult with anyone, but may make full use of the library and all electronic resources. The student will be expected to present a 45-50 minute research grade seminar using the scientific paper of choice. The QE1 committee will then test the student's understanding on all aspects of biology relating to the paper. This may include any background necessary for a truly in-depth understanding of the paper. The oral exam is expected to take 60-90 minutes.

The QE1 committee will consist of four standing members representing each track. In addition, a fifth ad hoc member will attend the exam. The ad hoc member will be selected by the committee and will be an additional representative whose expertise covers the area of the selected paper. This fifth person may vary for each student.

The QEI committee will provide their recommendation (Pass/Conditional Pass/Fail) to the Graduate Academic Committee after all students have completed the exam. If appropriate, the QEI committee will recommend a Retake of the exam, and will provide conditions that must be satisfied to pass the exam.

The GAC will review each candidate's overall progress through the first year in the context of the QEI result. The results of the recommendation of the GAC will be communicated to the student in an individual meeting with the GAC chair and the QEI committee chair. Passing the QEI is necessary but not sufficient for continuation in the PhD program. Students who fail QEI, but have passed each of their first year courses to the satisfaction of the GAC, may be allowed to retake the exam before the start of the second year. A second failure in the QE1 would result in dismissal from the PhD program. Students who fail the QE1 and do not make satisfactory progress in their course work will be dismissed from the PhD program.

Students on academic probation are not permitted to take QEI. Exceptions to this policy will be reviewed on an individual basis by the Graduate Academic Committee. Students seeking an exception must submit a written request to the GAC. Letters of evaluation from all rotation mentors must accompany the petition to the GAC.

MS students will be allowed to take QEI upon permission of the Graduate Academic Committee. Passing QEI would be necessary but not sufficient for acceptance into the PhD program, which decision would be made by the Admissions Committee.

Part II: Defense of Proposal

By the end of the third semester, the PhD Dissertation Committee must be formed. The Dissertation Committee is chaired (in the usual case) by the research mentor (a non-voting member) and composed of at least four other members, two BMS Department faculty members from the student's program area (track), one BMS faculty member outside the program area and one member whose primary academic appointment is outside the BMS Department, and who may be from another institution. In the case where the mentor is ineligible to chair the PhD Dissertation Committee, the committee may designate another member as chair, who then serves as a voting member. The composition of the PhD Dissertation Committee will be reviewed by the Graduate Academic Committee for final approval.

Within one year of successfully completing Part I of the qualifying exam, the student should complete Part II, a defense of proposal. This exam will test the student's depth of knowledge in his/her chosen area of specialization as well as the student's ability to write and defend a research proposal. This examination is to be on a topic intended to serve as the basis for the student's PhD dissertation research.

The student will write the proposal in the format of a mini-grant application, equivalent to a NRSA fellowship.* The written proposal should be no longer than 10 single-spaced pages (not including references) and should consist of an abstract, background and significance, specific aims and experimental design. **Preliminary data are not required**. If preliminary data have been obtained, then it should be included in the background materials and may be included in the oral presentation. The student may consult with anyone in the course of preparing the proposal, but the written document must represent the student's own work. The mentor may aid in the development of specific aims and construction of a topical outline for the dissertation proposal. The mentor also may direct the student to relevant literature and may edit an initial draft. However, the mentor should not act as co-author. The research proposal will be judged on standard criteria, including, but not limited to, the student's grasp of the field, significance of the proposed work, originality and depth of thought and the feasibility of the experimental approach.

> **Additional information on the NRSA/F31 application can be found at http://grants.nih.gov/grants/guide/pa-files/PA-11-111.html*

The Qualifying Exam Part II must be completed by **June 1 of the second year of full-time study**. Students must adhere to the following deadlines when preparing for the Qualifying Exam Part II:

April 1 – Notify Department Office of the date of the oral defense by submitting the QEII Oral Defense Scheduling Form.

Two weeks before Defense Date – The student will distribute to all members of the dissertation committee and the Department Office with an electronic version of the written proposal.

June 1 – The oral defense must be held **no later than June 1** of the second year of study.

The Department Office will provide the dissertation committee chair with course grades, laboratory rotation evaluations, and Qualifying Exam Part I results to review with the committee prior to the Qualifying Exam Part II oral defense. At the oral defense, the student will answer questions on the proposal and on related topics, focusing on (but not restricted to) the student's program area.

The Dissertation Committee will provide a grade of Pass, Conditional Pass, or Fail. The student must pass the exam by a majority vote of the Committee. If the student does not satisfactorily complete this part of the exam, the Dissertation Committee will make appropriate recommendations to the Graduate Academic Committee, which may include modifying the proposal and re-taking the exam, completing remedial course work, or dismissal from the program. The date and results of the exam will be communicated by the Dissertation Committee Chair to the Graduate Academic Committee and the Department Chairperson. If the student receives a Conditional Pass on the exam, the conditions must be met within three months or the student will receive a grade of Fail. If the student receives a grade of Fail, the exam may be re-taken once, and must be completed within three months.

All students are strongly encouraged to submit proposals for pre-doctoral training awards following completion of the Qualifying Exam Part II.

DISSERTATION RESEARCH AND ANNUAL REVIEWS

The Dissertation Committee will meet regularly with the student throughout the course of his/her dissertation research to evaluate progress and advise. It is the responsibility of the student, along with his/her Dissertation Committee Chair to ensure that these periodic reviews are scheduled every 9 to 12 months.

The Department requires that students provide a 4-5 page summary of their research to their Dissertation Committee one week prior to the annual committee meeting. The format of this summary should not be an outline or bullet highlights, but rather, it should be written in prose as a modified version of an NIH Progress Report*. In addition to standard sections (Specific Aims, Studies & Results, Significance, Plans), the report should start with a short introduction to the project, and may also include figures and/or tables that would help clarify the points made in the report.

> ** Additional information on NIH progress report guidelines can be found at http://grants.nih.gov/grants/funding/2590/phs2590.pdf*

The student's thesis/dissertation committee should evaluate the content and structure of the written summary along with their evaluation of the student's research progress. A copy of this summary must be appended to the annual report, along with the signature form and the mentor's summary of progress/meeting discussion, which is submitted to the Graduate Academic Committee after each meeting. These reports will become part of the student's academic file.

DISSERTATION DEFENSE AND SUBMISSION OF WRITTEN DISSERTATION

The Dissertation Committee also is responsible for evaluating and accepting the final written dissertation and conducting the student's oral dissertation defense. However, it is the student's responsibility to ensure that the final document submitted to the University is prepared according to department and University guidelines (visit http://www.albany.edu/gradstudies/degreecomp/ for information on University guidelines for submission of the dissertation).

Part of the evaluative process is determination of whether the student has produced a body of work which is publishable. As a guide, doctoral students in the Department of Biomedical Sciences typically publish three peer-reviewed publications based on their dissertation research, two of which are first-authored, by the end of their tenure in the program. Acceptance of the dissertation will be by majority vote of the Dissertation Committee, and is subject to the approval of the Department Chair and the Graduate Office.

Students should note the following deadlines for submission of the final dissertation document to the Office of Graduate Studies:

December 1 – Fall Graduation
May 1 – Spring Graduation
August 1 – Summer Graduation

In order to meet these deadlines, the dissertation defense and oral presentation should be scheduled at least two (2) weeks prior to the submission date specified above. The student must notify the BMS Department Office **at least three weeks before** the scheduled oral defense by submitting the Thesis/Dissertation Seminar and Defense Scheduling Form and providing the date, time, location, and title of presentation.

Following successful completion of the defense, the Dissertation Transmittal form must be signed by the dissertation committee and submitted to the BMS Department Office. The Department will then complete the Recommendation for Conferral of Degree and submit both forms directly to the Office of Graduate Studies, verifying that all requirements for successful completion of the doctoral degree have been fulfilled.

Program of Study - Immunology and Infectious Diseases Track

Department Requirements (6 minimum to 9 maximum credits)	**Credits**	**Grade**	**Semester Offered / Semester Taken**
BMS 590: Laboratory Rotations	1		Fall – Year 1
BMS 665: QEI Journal Club BMS 665: Journal Club	1 0-3		Spring - Year 1 Fall/Spring every year starting Year 2
BMS 670: Responsible Conduct of Research	1		Fall or Spring
BMS 601: Introduction to Biomedical Sciences	3		Fall – Year 2
Track Requirements (10 credits)			
BMS 500: Molecular Biology	4		Fall - Year 1
BMS 502: Macromolecular Structure & Function	4		Fall - Year 1
BMS 506: Immunology	2		Spring – Year 1
One of the following courses is required (3 credits)			
BMS 514: Molecular and Cellular Immunology	3		Even Fall
BMS 610: Microbial Pathogenesis	3		Odd Spring
Electives (16 - 19 credits)			
Total course credits required = 38			
PhD Research Credits (**28** total required - combined BMS 898 and BMS 899)			
Research Tool	0		

Mentor Approval Form. Date submitted: _____ QE I: End of first year. Date: _____

Dissertation Committee Formed. Date: _____ QE II: End of second year. Date: _____

Research Tool Completed. Date: _____ Candidacy: Date: _____

Program of Study - Molecular Genetics Track

Department Requirements (6 minimum to 9 maximum credits)	**Credits**	**Grade**	**Semester Offered / Semester Taken**
BMS 590: Laboratory Rotations	1		Fall – Year 1
BMS 665: QEI Journal Club BMS 665: Journal Club	1 0-3		Spring - Year 1 Fall/Spring every year starting Year 2
BMS 670: Responsible Conduct of Research	1		Fall or Spring
BMS 601: Introduction to Biomedical Sciences	3		Fall – Year 2
Track Requirements (8 credits)			
BMS 500: Molecular Biology	4		Fall - Year 1
BMS 502: Macromolecular Structure & Function	4		Fall - Year 1
Electives (21 - 24 credits)			
Total course credits required = 38			
PhD Research Credits (**28** total required - combined BMS 898 and BMS 899)			
Research Tool	0		

Mentor Approval Form. Date submitted: _____ QE I: End of first year. Date: _____

Dissertation Committee Formed. Date: _____ QE II: End of second year. Date: _____

Research Tool Completed. Date: _____ Candidacy: Date: _____

Program of Study - Neuroscience Track

Department Requirements (6 minimum to 9 maximum credits)	**Credits**	**Grade**	**Semester Offered / Semester Taken**
BMS 590: Laboratory Rotations	1		Fall – Year 1
BMS 665: QEI Journal Club BMS 665: Journal Club	1 0-3		Spring - Year 1 Fall/Spring every year starting Year 2
BMS 670: Responsible Conduct of Research	1		Fall or Spring
BMS 601: Introduction to Biomedical Sciences	3		Fall – Year 2
Track Requirements (8 credits)			
BMS 500: Molecular Biology	4		Fall - Year 1
BMS 502: Macromolecular Structure & Function	4		Fall - Year 1
The following courses are required (6 credits)			
BMS 604: Cellular and Molecular Neuroscience	3		Spring
BMS 612: Neuroanatomy and Nervous System Disorders	3		Fall
Electives (15 - 18 credits)			
Total course credits required = 38			
PhD Research Credits (**28** total required - combined BMS 898 and BMS 899)			
Research Tool	0		

Mentor Approval Form. Date submitted: _____ QE I: End of first year. Date: _____

Dissertation Committee Formed. Date: _____ QE II: End of second year. Date: _____

Research Tool Completed. Date: _____ Candidacy: Date: _____

Program of Study - Structural and Cell Biology Track

Department Requirements (6 minimum to 9 maximum credits)	**Credits**	**Grade**	**Semester Offered / Semester Taken**
BMS 590: Laboratory Rotations	1		Fall – Year 1
BMS 665: QEI Journal Club BMS 665: Journal Club	1 0-3		Spring - Year 1 Fall/Spring every year starting Year 2
BMS 670: Responsible Conduct of Research	1		Fall or Spring
BMS 601: Introduction to Biomedical Sciences	3		Fall – Year 2
Track Requirements (8 credits)			
BMS 500: Molecular Biology	4		Fall - Year 1
BMS 502: Macromolecular Structure & Function	4		Fall - Year 1
One of the following courses is required (3 credits)			
BMS 606: Biology of Model Organisms	3		Odd Fall
BMS 622: Cancer Biology	3		Spring
BMS 635: Methods in Structural Biology	3		Odd Spring
Electives (18 - 21 credits)			
Total course credits required = 38			
PhD Research Credits (**28** total required - combined BMS 898 and BMS 899)			
Research Tool	0		

Mentor Approval Form. Date submitted: _____ QE I: End of first year. Date: _____

Dissertation Committee Formed. Date: _____ QE II: End of second year. Date: _____

Research Tool Completed. Date: _____ Candidacy: Date: _____

Program of Study – Biodefense and Emerging Infectious Disease Training Program

Department Requirements (6 minimum to 9 maximum credits)	**Credits**	**Grade**	**Semester Offered / Semester Taken**
BMS 590: Laboratory Rotations	1		Fall – Year 1
BMS 665: QEI Journal Club BMS 665: Journal Club	1 0-3		Spring - Year 1 Fall/Spring every year starting Year 2
BMS 670: Responsible Conduct of Research	1		Fall or Spring
EPI 501: Principles and Methods of Epidemiology (satisfies BMS 601 requirement)	3		Fall – Year 2
Program Requirements (26 credits)			
BMS 500: Molecular Biology	4		Fall - Year 1
BMS 502: Macromolecular Structure & Function	4		Fall - Year 1
BMS 506: Introduction to Immunology	2		Spring - Year 1
BMS 555: Biodefense Sciences	1		
BMS 556: Biodefense Laboratory	1		
BMS 557: Emerging Infectious Disease	1		Spring - Year 1
BMS 514: Cellular and Molecular Immunology	3		Even Fall
BMS 553: Virology	4		Odd Fall
BMS 610: Microbial Pathogenesis	3		Odd Spring
BMS 632: Molecular and Cellular Prokaryotes	3		Even Spring
One of the following courses is required (3 credits)			
BMS 552: Medical Entomology	3		Even Spring
EPI 605: Epidemiology of Infectious Disease	3		
Electives (0 – 3 credits)			
Total course credits required = 38			
PhD Research Credits (**28** total required - combined BMS 898 and BMS 899)			
Research Tool	0		

Mentor Approval Form. Date submitted: _____ QE I: End of first year. Date: _____

Dissertation Committee Formed. Date: _____ QE II: End of second year. Date: _____

Research Tool Completed. Date: _____ Candidacy: Date: _____

Program of Study - IGERT Training Program

Department Requirements (6 minimum to 9 maximum credits)	**Credits**	**Grade**	**Semester Offered / Semester Taken**
BMS 590: Laboratory Rotations	1		Fall – Year 1
BMS 665: QEI Journal Club BMS 665: Journal Club	1 0-3		Spring - Year 1 Fall/Spring every year starting Year 2
BMS 670: Responsible Conduct of Research (satisfies Cornell MSE 4870 Ethics and Technology)	1		Fall or Spring
BMS 601: Introduction to Biomedical Sciences	3		Fall – Year 2
Track Requirements (14 credits)			
BMS 500: Molecular and Cell Biology	4		Fall - Year 1
BMS 502: Macromolecular Structure & Function	4		Fall – Year 1
BMS 604: Cellular and Molecular Neuroscience	3		Spring – Year 1
BMS 612: Neuroanatomy and Nervous System Disorders	3		Fall – Year 2
IGERT Trainee Requirements (9 credits)			
BMS 655: Nanobiotechnology (Cornell BME 6670) – via WebX	3		
Bioelectronic Technology Development (Cornell 5670) – via videoconference or approved substitute	3		
Flexible Electronics (Cornell MSE 5420) – via videoconference or approved substitute	3		
Electives (6 - 9 credits)			
Total course credits required = 38			
PhD Research Credits (28 total required - combined BMS 898 and BMS 899)			
Research Tool – Cornell AEP 5710 Biophysical Technology Development	0		January Winter recess

Mentor Approval Form. Date submitted: _____ QE I: End of first year. Date: _____

Dissertation Committee Formed. Date: _____ QE II: End of second year. Date: _____

Research Tool Completed. Date: _____ Candidacy: Date: _____