

WASHINGTON STATE UNIVERSITY
SCHOOL OF MOLECULAR BIOSCIENCES



MOLECULAR BIOSCIENCES GRADUATE PROGRAM
HANDBOOK & STUDENT LEARNING ASSESSMENT

2018 - 2019

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SCHOOL OF MOLECULAR BIOSCIENCES ASSOCIATE DIRECTOR'S STATEMENT

I am very pleased to welcome you to the Molecular Biosciences Graduate Program in the School of Molecular Biosciences (SMB) at Washington State University. I expect and hope that you are excited about your transition to graduate school. I also realize, however, that this new training experience can be a little scary. I emphasize that in SMB you will find a supportive faculty and staff who will facilitate your transition. They are eager and willing to advise you in developing a training program that suits you. Furthermore, we have an outstanding training faculty who will be your guide as you hone your research skills. Finally, you will have the opportunity to teach. Make the most of this since it is a very rewarding experience.

The graduate handbook provides key information that will help you throughout your time as a graduate student. In addition, I am sure you will enjoy the social and professional development events hosted by our very active Graduate Student Association (MBGSA). These events not only allow you to meet your fellow students but also may assist you in determining what you do after graduate school.

SMB is committed to your training. Enjoy your teaching and research!

Cheers,

Jennifer L. Watts, PhD

Associate Director, School of Molecular Biosciences, Graduate Programs

ACKNOWLEDGMENTS

This handbook is the compilation of documents and information from many sources. Some parts come from the WSU Graduate School, but many are derived from the efforts of current and former SMB faculty, faculty associates, graduate students and staff. There are too many valued contributors to acknowledge each individually, and the list grows with each yearly up-date. However, special thanks go to the former Associate Directors for Graduate Studies who generated many of the initial documents (Kathleen (Kotty) Postle and Kwanhee Kim—who had the vision to assemble the first SMB Graduate Handbook) and to Lisa Gloss, the Associate Director for Graduate Studies from 2007-2013; current and past members of the Graduate Studies Committee and the Graduate Affairs Committee; and Ron Brosemer for his detailed and witty instructions for student seminar presentations.

A hearty thank you to all contributors!

Updated June 15, 2018 by Jennifer Watts, the SMB Associate Director for Graduate Studies

MOLECULAR BIOSCIENCES GRADUATE STUDENT ASSOCIATION (MBGSA)

The MBGSA would like to welcome you to Pullman and the Washington State University School of Molecular Biosciences (SMB)! MBGSA is a student led organization that seeks to unite the graduate students in SMB. MBGSA provides an effective and influential voice for the students' viewpoint regarding various departmental issues and acts as a liaison between students, faculty, and administration. MBGSA also works closely with the WSU Graduate and Professional Student Association (GPSA), enabling graduate students to have an active voice in matters of WSU policy and campus-wide activities.

A major goal for MBGSA is to organize various service activities by and for the graduate students of SMB.

- At the beginning of Fall Semester, MBGSA helps to facilitate the annual SMB retreat. These retreats are an opportunity to relax, have fun in an informal setting, and to build relationships with students and faculty.
- MBGSA is also responsible for facilitating various activities for students and faculty throughout the year.
- Past events included the SMB Halloween Party, fielding a team in the American Cancer Society Relay for Life, family night with bowling at Zeppoz, graduate student night at Rico's, the annual summer family picnic, and badminton/volleyball at the Student Recreational Center.
- The MBGSA also invited speakers who participated in professional/career development workshops.
- Once a month, MBGSA holds a meeting for graduate students (with lunch or snacks) to discuss current issues and events.
- MBGSA hopes to provide communication, community and support for all incoming students as you adjust to the challenges and demands of graduate school.
- MBGSA has also compiled *The MBGSA Survival Guide* to ease the first year students' transition to Pullman and the WSU campus. The original was put together by Matt Stump and Trisha Brock.

MBGSA OFFICERS FOR 2017-2018

President	Andrea Connor	Andrea.connor@wsu.edu
Vice President	Dalton Plummer	dalton.plummer@wsu.edu
Secretary/Treasury	Kaitlynn Bohm	kaitlynn.bohm@wsu.edu

MOLECULAR BIOSCIENCES GRADUATE PROGRAM

Michael Griswold SMB Director, Regents Professor	335-8724	mgriswold@wsu.edu
Jennifer Watts SMB Associate Director, Graduate Studies	335-8554	jwatts@wsu.edu
Tami Breske SMB Graduate Academic Coordinator	335-4318	tamara.breske@wsu.edu
Terry Hassold SMB Ombudsman	335-4953	terryhassold@wsu.edu

OTHER QUICK CONTACT INFORMATION

Graduate School	335-1446	http://gradsch.wsu.edu/
Graduate Professional Student Association	335-9545	www.gpsa.wsu.edu/
Health and Wellness Services	335-3575	http://hws.wsu.edu/
Payroll and Benefits	335-9575	www.wsu.edu/payroll/stntpay/stntpay.htm
Student Recreation Center	335-UREC	http://urec.wsu.edu/
Women's Transit	WSU-267-SAFE	http://women.wsu.edu/
WSU Parking Services	335-PARK	https://transportation.wsu.edu/
WSU Child Care Resource and Referral	335-7625	www.wsu.edu/CCRR/
WSU Visitor's Center	335-4636	http://visitor.wsu.edu/
Pullman Chamber of Commerce	334-3565	www.pullmanchamber.com/
Pullman Regional Hospital	332-2541	www.pullmanhospital.org/
Veterinary Hospital	335-0711	http://vth.vetmed.wsu.edu/
WSU Pharmacy	335-5742	http://hws.wsu.edu/pharmacy/
Beasley Coliseum, buying event tickets	335-1514	http://beasley.wsu.edu/

RESEARCH ACTIVITIES OF GRADUATE STUDENT TRAINERS, 2018-2019

MOLECULAR BIOSCIENCES GRADUATE PROGRAM

See our web page for more information: http://molecular.biosciences.wsu.edu/faculty/smb_fac_research.html

*Associate faculty; #Spokane campus; ### Vancouver campus

NAME	RESEARCH ACTIVITIES
Alderete, John alderete@wsu.edu	The study of parasite and host cell-tissue interactions focused on proteins that contribute to infection and disease pathogenesis in <i>Trichomonas vaginalis</i>
Bankhead, Troy * tbankhead@wsu.edu	Antigenic variation in the Lyme disease spirochete, <i>Borrelia burgdorferi</i>
Black, Margaret blackm@wsu.edu	Molecular evolution, pathway engineering and extensive in vitro and in vivo analyses to improve and evaluate suicide genes for gene therapy of cancer
Brayton, Kelly * kbrayton@wsu.edu	Infection biology of the tick-borne pathogen <i>Anaplasma marginale</i>
Browse, John * jab@wsu.edu	Lipid and membrane biochemistry; pathways and regulation of lipid synthesis and membrane formation in plants; chilling and freezing tolerance in plants
Call, Douglas * drcall@wsu.edu	Evolution and persistence of antibiotic resistance; molecular epidemiology; comparative genomics, transcriptomics, and proteomics of pathogens; detection pathogens in complex matrices; and aquaculture health
Carabeo, Rey rey.carabeo@wsu.edu	<i>Chlamydia trachomatis</i> -epithelium interaction using 3D cell culture systems; Molecular biology of iron-dependent repression of transcription in <i>Chlamydia</i>
Celli, Jean * jcelli@wsu.edu	Molecular mechanisms of <i>Brucella abortus</i> modulation of host cell functions
Chai, Weihang *# wchai@wsu.edu	Telomere structure, maintenance and function
Chandra, Murali * murali@wsu.edu	Understanding the molecular mechanisms responsible for regulation of the contractile machinery of heart muscle cells, and how myofilament remodeling is linked to pathogenesis of heart diseases
Cooper, Cynthia ### cdcooper@vancouver.wsu.edu	Zebrafish developmental mechanisms
Cornejo, Omar * Omar.cornejo@wsu.edu	Population genomics in health and disease. Evolutionary analysis of microbes and hosts
Driskell, Ryan R. rdriskell@wsu.edu	Achieving skin regeneration by understanding skin development during embryogenesis
Goodman, Alan G. agoodman@wsu.edu	The host immune response to pathogenic infection
Griswold, Michael mgriswold@wsu.edu	Biochemistry and molecular biology of mammalian spermatogenesis with emphasis on testicular somatic cells
Harding, Joseph * hardingj@wsu.edu	Small molecule therapeutics and cellular signaling

NAME	RESEARCH ACTIVITIES
Haseltine, Cynthia chasetline@wsu.edu	Mechanisms of homologous recombination and cellular responses to DNA damage in hyperthermophilic archaeal microbes.
Hassold, Terry terryhassold@wsu.edu	Meiotic chromosome abnormalities
Her, Chengtao cher@wsu.edu	The roles of mismatch repair genes in human cancer
Hunt, Patricia pathunt@wsu.edu	Meiosis in mammalian germ cell development
Kahn, Michael * kahn@wsu.edu	Biochemistry, genetics and physiology of metabolism in the nitrogen-fixing symbiosis between rhizobia and legume plants
Kang, ChulHee * chkang@wsunix.wsu.edu	Looking for new therapeutic strategy by understanding DNA/RNA/Protein-Protein interaction via Crystallography and Protein engineering
Karatsoreos, Iliia * iliak@wsu.edu	Biological rhythms, gonadal hormones, and neural plasticity
Kawula, Thomas * tom_kawula@wsu.edu	Pathogenic and immune evasion mechanisms of intracellular pathogens
Kelley, Joanna * Joanna.I.Kelley@wsu.edu	Evolutionary genomics and adaptation by statistical, molecular and genomic approaches to identify/characterize specific genes and pathways
Kim, Kwanhee khkim@wsu.edu	Retinoic acid receptor function in the testis; Epigenetic changes by environmental toxins, plasticizer phthalates
Knodler, Leigh * lknodler@wsu.edu	Salmonella-intestinal epithelial cell interactions
Konkel, Michael konkel@wsu.edu	Bacterial pathogenesis, identification and characterization of virulence determinants in <i>Campylobacter jejuni</i>
Lange, B. Mark * lange-m@wsu.edu	Pathways leading to natural products (with an emphasis on isoprenoids) using functional genomics and systems biology approaches
Nicola, Anthony * nicola@wsu.edu	Cell biology of virus-host interactions, herpesviruses, viral entry, membrane fusion, envelope glycoproteins, viral pathogenesis
Oatley, Jon joatley@wsu.edu	Molecular mechanisms that control the fate of germline stem cells and the determinants of the stem cell niche in mammalian testes
Offerdahl, Erika eofferdahl@wsu.edu	Teaching and learning of biochemistry, microbiology, and molecular biology with particular emphasis on visualization and student cognition.
Omsland, Anders* omslanda@wsu.edu	Biology of bacterial obligate intracellular parasites; virulence, metabolic capabilities, and regulation of bacterial morphological transitions

NAME	RESEARCH ACTIVITIES
Pru, James * jpru@wsu.edu	Molecular events coordinating the physiology of embryo implantation using the mouse and domestic ruminants as model organisms

Roberts, Kenneth P. *# kenroberts@wsu.edu	Epididymal sperm maturation and sperm function
Roberts, Steven A. sroberts@wsu.edu	Genome dynamics: mechanisms of mutation and chromosome alteration that contribute to human disease. Mutagenesis of ssDNA in cancer
Shelden, Eric eshelden@wsu.edu	Cytoskeletal regulation and dynamics during injury, migration and differentiation of mammalian cells.
Sylvester, Steve ### ssylvester@vancouver.wsu.edu	Molecular mechanisms of toxicity and predator-prey interactions.
Tanner, Bertrand * btanner@wsu.edu	Computational and experimental studies of striated muscle mechanics
Thomashow, Linda * linda.thomashow@ARS.USDA.GOV	Molecular genetics of bacterial-plant and bacterial-fungal interactions
Trobridge, Grant * grant.trobridge@wsu.edu	Oncogene discovery using retroviruses and Stem cell gene therapy for HIV infection
Vadyvaloo, Viveka * vvadyvaloo@wsu.edu	Arthropod-borne zoonotic infectious diseases, including the etiological agent of the bubonic plague, <i>Yersinia pestis</i>
Walker, Brendan* brendan.walker@wsu.com	Molecular, genetic and epigenetic contributors to maladaptive behavioral dysregulation in alcohol dependence and neuropsychiatric disorders
Watts, Jennifer L. jwatts@wsu.edu	Genetics and genomics of lipid metabolism and fat storage in <i>C. elegans</i>
Wayman, Gary * waymang@wsu.edu	Determine the molecular and cellular mechanism by which synaptic activity and neurotrophic factors influence neuronal development
Winuthayanon, Wipawee (Joy) winuthayanonw@wsu.edu	Ovarian hormonal regulation in the female reproductive track during early pregnancy
Wyrick, John jwyrick@wsu.edu	Regulation of eukaryotic genome expression; histone acetylation; and the development of new functional genomic and bioinformatic tools
Xun, Luying luying_xun@wsu.edu	Molecular biology and biochemistry of microbial degradation and biotransformation of xenobiotics and environmental pollutants

MOLECULAR BIOSCIENCES (MB) GRADUATE PROGRAM

A. APPLICATION FOR ADMISSIONS INFORMATION

The School of Molecular Biosciences (SMB) offers Ph.D. and M.S. degrees in Molecular Biosciences with discipline areas in Biochemistry, Genetics & Cell Biology and Microbiology. The MB Graduate Program is a member of the Integrated Programs in Biomedical Sciences (iPBS) in the College of Veterinary Medicine

- Students wishing to pursue graduate studies in the MB Graduate Program should have an undergraduate major in biochemistry, biophysics, cell biology, genetics, microbiology, biology, chemistry or closely related fields.
- Expected undergraduate coursework includes general biology, general and organic chemistry, biochemistry, physics, calculus and/or statistics, and some advanced biology courses (such as genetics, cell, developmental or molecular biology or microbiology).
- Evaluation of completed applicant files will begin on December 15th for admission for the fall semester of the next calendar year. Admission for the spring semester is only offered in exceptional situations; applicants are evaluated on a case-by-case basis.

The following documents should be submitted by the priority deadline of December 15th.

1. All students (domestic and international)

- Graduate School Application and \$75 application fee**
 - Forms and instructions are available through the [WSU Graduate School](#) website.
- Statement of Purpose**
 - Within the Graduate School Application is a request for your statement of purpose (personal statement) to describe your goals and interests, research accomplishments, and academic awards.
- Standardized tests: general GRE and TOFEL**
 - Self-reported scores should be included on the MB Graduate Program application. International students should report a recent TOFEL score as well.
- Three letters of recommendation**
 - Letters should be submitted through the “on line” application with the Graduate School.
- Transcripts**
 - For domestic students, official transcripts should be sent by the school(s) directly to the WSU Graduate School.
- Answer two video questions**
 - You will be sent a link after you have submitted the application. You have one chance to submit the answers.

2. International Students

- a. Applicants who attended school outside the United States or Canada must submit:
 - **Transcripts**, mark sheets, grade reports, or examination results, along with degree certificates from all higher education institutions attended outside the United States or Canada.
 - When sending official transcripts from schools located in non-English-speaking countries, have each institution submit both the English translation plus an original language record
- b. **TOFEL scores required**
 - For international applicants who have not earned a degree from a US institution, a TOFEL score of at least 100 (internet based exam) is required, and the test date must be within two years prior to the expected admission date.

B. FIRST YEAR GRADUATE STUDENT ORIENTATION GUIDE

1. ORIENTATION WEEK AND YOUR FIRST ROTATION

The orientation week for incoming students in the School of Molecular Biosciences (SMB) begins Monday, August 13th in 2018. At latest, you should report August 13th at 10:30 AM to the SMB Academic Office, Biotechnology/Life Science Building (BLS), Room #102, unless otherwise arranged. Preferably, you are expected to arrive in Pullman and settle into your residence prior to August 13th and check-in a few days prior to the first day of orientation to do your employment paperwork, obtain a WSU ID, set up an email account and receive a detailed, final orientation schedule, etc.

On Wednesday, August 15th of the orientation week, you are expected to attend the Graduate School Orientation activities held in CUB Senior Ballroom from 8 AM to 4 PM. We request that you register at <https://gradschool.wsu.edu/orientation/> before your arrival in Pullman.

Monday through Friday of orientation week you are expected to attend several graduate student workshops/functions that are shared among the four graduate programs (Molecular Biosciences, Neuroscience, Immunology and Infectious Disease, and Veterinary Clinical Sciences) that comprise the iPBS as well as those that are Molecular Biosciences Graduate Program specific. The primary purpose of these meetings is to welcome new students to WSU, provide important graduate program information, and advise students about expectations and responsibilities of a graduate student, including teaching assistant duties. Additional workshops cover several items including academic regulations, academic integrity, your work schedule and vacation time, travel authorization, professionalism, the role of the ombudsman, etc. You also will have your photo taken during the “photo session” scheduled during orientation week. This picture will be used in various SMB displays that let faculty, staff, and students learn who you are.

During orientation week there will be iPBS leadership and professional development activities with faculty and students from the four graduate programs of the iPBS. Finally, Thursday of the orientation week will be an SMB retreat (see #2 for details).

Fall classes and your first laboratory rotation begin on the first day of fall semester, August 20th. You will have an individual academic advising meeting with the SMB Graduate Affairs Committee (SMB-GAC) on Tuesday of the orientation week to discuss courses and your first laboratory rotation (see #3 for details).

2. ANNUAL SCHOOL RETREAT

Every year in August there is an SMB retreat. In 2018, it is on August 16th. The annual retreat begins our academic year by building community spirit, recognition of achievements, and stimulating scientific curiosity and collaborations. This is one way we can learn more about each other, develop new interactions, and celebrate both individual and collective accomplishments. The focus of the retreat varies from year-to-year, but will generally include an overview of the scientific accomplishments of the school during a poster session and ample opportunities for scholarly and social networking amongst the members of SMB. Attendance by all members of SMB is essential to meet the goals of the annual retreat; therefore, we aim for 100% participation.

3. INDIVIDUAL STUDENT ACADEMIC ADVISING

The SMB-Graduate Affairs Committee (GAC) is your sole Advising Committee (chaired by the SMB Associate Director for Graduate Studies) in SMB until you find your thesis home. After you find your thesis home, SMB-GAC will serve as your Advising Committee, as needed. During the orientation week, the SMB-GAC will meet with each student to advise him or her about courses, laboratory rotations, and required participation in seminars, including the faculty research brown-bag lunches, graduate student seminars, and outside speaker seminars.

The SMB-GAC will assist each student in selecting rotation laboratories. We recommend that you contact faculty via email and visit with faculty members prior to the orientation week to help setup your first rotation (only your first laboratory rotation). Laboratory rotation decisions need to have the consent of the faculty member and approval of the SMB Associate Director for Graduate Studies. A directory of graduate training faculty and their research interests is included in this handbook. For your 2nd and 3rd laboratory rotations, the SMB-GAC will meet with each first year student prior to the rotation start dates. The SMB-GAC will provide guidance in the selection of their remaining laboratory rotations, eventual selection of a thesis laboratory, and discuss courses for spring semester as well as any other pertinent issues.

4. TEACHING ASSISTANT TRAINING AND ASSIGNMENT

If you are supported on a teaching assistantship, you will receive a memo each term that will indicate the course you will be teaching and the instructor. Please contact the instructor as soon as you can. All first year students must attend the SMB teaching assistant training session during orientation week and the TA writing workshop, when it is provided later, because all students are required to teach a minimum of one semester at some time during their graduate career. The person in charge of the TA assignments is the SMB Associate Director of Graduate Studies. If you have any questions or concerns about your TA position, you can contact the SMB Associate Director of Graduate Studies.

5. PERSONNEL ACTION FORM PROCESSING

We expect that you will check-in to the SMB Academic Office in BLS 102 a few days prior to the orientation week. At latest, you should report to the SMB Academic Office August 13th at 7:30 AM, unless otherwise arranged. You will be directed to the SMB Administration Office in BLS 202 to assist you in processing all the necessary paperwork, including the Personnel Action Form (PAF) for getting your stipend that is part of your assistantship. We also have a time scheduled with the staff on Friday of the orientation week, if you have not completed the PAF paperwork prior to the start of the orientation week. To complete the PAF paperwork, you must bring proof of citizenship, e.g., driver's license or passport and original social security card (unlaminated). International students should bring their valid passport, I-94, I-20 and social security card. International students who do not have a social security card will have the opportunity to apply for one during orientation week. A Personnel Action Form must be processed prior to the beginning of classes for you to be paid in a timely manner. Students on an assistantship are usually paid the 10th and 25th of each month. Direct deposit of your check is encouraged, and a direct deposit application form is given to you during personnel processing.

6. MAILBOX, COUGAR/WSU ID CARD, AND WSU NETWORK ACCESS

As a first year student, you will be assigned a mailbox in BLS 102. It is important that you check your mailbox on a regular basis as this is one of the ways you will receive many important forms and notices.

To obtain your Cougar Card (your official, multi-purpose WSU photo ID card), you must go to the Compton Union Building (CUB), room 60. A Cougar Card is required for access to the BLS building and laboratories, library privileges, the Student Recreation Center, and for riding Pullman Transit buses, the use of CougarCASH, and admission to university events and activities. To obtain your Cougar Card, you will need your WSU ID number and one piece of photo ID.

All incoming graduate students are required to set up a Network ID and a WSU email account. Many essential SMB communications with students are done through email. Servers such as Hotmail, AOL and Yahoo are not adequate for our purposes, as they cannot be used on Exchange server mail-lists and often lose important emails and attachments. You must check your WSU email regularly; not receiving information because you didn't check your email is not an acceptable excuse! You can set up a Network ID and a WSU account as well as change your mailing address to a local address by logging onto MyWSU through <http://www.wsu.edu/>. As soon as you know your physical address and have set up your email address, please let Tami Breske, the Graduate Academic Coordinator (335-4318; smbgrad@wsu.edu; BLS 102) know your contact information.

7. SAFETY, ACADEMIC INTEGRITY, AND RESPONSIBLE CONDUCT IN RESEARCH TRAINING

Washington State University requires mandatory training in the Responsible Conduct of Research for all graduate students and can be accessed at myResearch.wsu.edu. For your assistantship paperwork to be processed, students must complete the training; otherwise, they will not be eligible for an assistantship. Students must complete the training before they begin their graduate studies (the start of first lab rotation).

In fact, all new graduate students must attend the Laboratory Safety, Biosafety, Academic Integrity and Student Conduct, Teaching Assistant, and Responsible Conduct in Research training workshops given during orientation week. Washington State statutes require certification of such training sessions before teaching a lab or conducting research. In addition, Graduate students working with radioactive material in their research must also take the on-line radiation safety training course at <http://www.rso.wsu.edu/aptouse/materials.html> arranged by their research laboratory. Students will receive an e-mail confirmation after passing the exam, which allows them to process the application for obtaining radiation badges, if needed. Additional specialized trainings may be required for research or teaching purposes, such as animal handling and vivarium training.

8. ESTABLISHING WASHINGTON STATE RESIDENCY

All students supported on assistantships are required to reside in the State of Washington. Further, students who are United States citizens are required to become residents of Washington State prior to the beginning of their second year to be eligible for continued tuition waivers; this does not apply to international students.

The university is very strict, requiring students to be a resident of Washington State to obtain an in-state tuition waiver after the first year. A full year of physical residence in Washington State is required before students can apply for in-state residence status. The twelve-month countdown starts from the time you are issued the last of three items: driver's license, motor vehicle registration, and a voter registration card. If you do not drive, obtain a Washington State ID card and register to vote. Further details about establishing residency are in the MBGSA Survival Guide. For the official change in residency to take effect, students must complete the Washington State University Residence Questionnaire

(<http://residency.wsu.edu/>) and submit it to the Graduate School with photocopies of the appropriate documentation. These documents must be submitted before the August of your second year. For more information, contact the Graduate School, French Administration Building 324, 335-3537.

9. INTERNATIONAL STUDENT INFORMATION

Students with an F-1 visa who are supported by an assistantship must apply for a social security number (SSN) to receive their stipend. Documents required for a SSN application are: 1) valid passport; 2) I-94 arrival/departure record; 3) F-1 visa stamp; 4) current WSU I-20; 5) photocopy of these documents; 6) completed SSN application form; 7) letter verifying an offer of assistantship on SMB letterhead, addressed to Social Security Administration; and 8) letter from the Office of International Student and Scholar (OISS) verifying your employment eligibility. Once all documents are ready, you can submit your application to a Social Security Administration representative in person at the Lewiston Social Security Office, 1617 19th Avenue, Lewiston, ID 83501, (208) 746-2995. We recommend that international students attend orientation sessions that include explanations about immigration regulations, social security number application, etc. offered by the OISS for new incoming students. For more information, visit online <http://ip.wsu.edu/students/index.html>.

Before serving as a TA, all international students must take the International Teaching Assistant (ITA) evaluation administered by the Intensive American Language Center (IALC). Detailed information is available at www.ialc.wsu.edu/. It is the Graduate School's requirement, on behalf of the State of Washington, that the English proficiency of all international TA's, for whom English is a second language, must be evaluated. A faculty representative (usually the SMB Associate Director for Graduate Studies or a member of the SMB-GAC) will help you prepare for the exam and accompany you to your ITA evaluation. The Evaluation Committee, which includes two members from the IALC, will make your ITA evaluation. The SMB graduate academic coordinator will help you register for and schedule your exam in coordination with your faculty representative.

For your exam, you should prepare a 10-minute mini-lecture on a topic from your field of study at a 100 (freshmen) level, e.g., a topic in basic biology or chemistry, using layman's terminology and good visual aids. You should prepare a PowerPoint presentation, but print your slides on transparencies; in the examination room, there will be an overhead projector, but not a computer projector. During the ITA evaluation, the lecture is usually videotaped. The total evaluation time is about 15 minutes, which includes questions asked at any time during your lecture. Usually the lecture is stopped before 15 minutes. You are evaluated on: 1) overall language comprehensibility; 2) cultural ability; 3) communication skills; and 4) interaction with students. After the lecture, you will be asked to leave the room while evaluators discuss your presentation with your faculty representative and give you a rating from 1 to 5. All students must be approved at level 1 (Approved for teaching all levels of classes) or level 2 (Approved for teaching upper level classes only (300 or higher level) to be able to teach. You will be told the result within five minutes, and the result will be sent to the Graduate School and to the Associate Director of Graduate Studies in SMB. You may also be given recommendations on courses to take to address your weaknesses. If your rating is below a 1 or 2, you are allowed to re-take the examination the following semester after evidence of improvement in your English.

C. MOLECULAR BIOSCIENCES (MB) GRADUATE PROGRAM (THESIS M.S. AND Ph.D. DEGREES)

This section provides specific details about expectations, requirements, and the sequence of events for successful completion of a thesis M.S. or a Ph.D. degree in Molecular Biosciences in the School of Molecular Biosciences.

LEARNING OUTCOMES

We are training students to become well-rounded scientists, able to do interdisciplinary research in the area of Molecular Biosciences. This is to be accomplished by inclusion of a well-rounded education including coursework; rotations through three laboratories to learn new techniques and about the faculty/research; learning oral communication skills with the teaching requirement, seminar requirement and attendance at regional and national conferences; learning written communication skills in the sciences with grant proposal writing and writing of annual reviews; as well as participating in professional development workshops through the iPBS and the Graduate School.

1. LABORATORY ROTATIONS

The purpose of laboratory rotations is for the student to be able to make an informed decision about the laboratory in which he/she wishes to perform dissertation research. First year students are required to do three laboratory rotations with a fourth being optional in the laboratories of Graduate Student Trainers, who can be a member of the SMB tenure-track or tenured faculty or SMB Associate Faculty. Typically, first year students do three eight-week laboratory rotations in fall and spring semesters, two in fall semester and one in spring semester, with an option to do fourth laboratory rotation in spring semester. This allows students to find their thesis home of choice by the end of the second semester. During individual advising meetings with the SMB-GAC during orientation week, students will be advised regarding laboratory rotations. Students are responsible for contacting the faculty with whom they are interested in rotating in order to make the appropriate arrangements. A maximum of two rotating students is permitted per lab per rotation period. The SMB Associate Director for Graduate Studies will oversee distribution of rotating students to the various research laboratories.

The expectations of the faculty member and the student about the rotation should be made clear at the outset, particularly as to amount of time and effort to be expended. Minimal expectations for a rotation student during the academic year are: 1) to attend lab meetings, unless teaching obligations do not permit; and 2) to spend an average of 15-20 hours/week doing research in the lab, as teaching and exam schedules permit. Faculty should make an effort to provide each rotation student with a valuable experience from the student's perspective. Faculty are encouraged to have their rotation students give a short presentation in the lab's group meeting at the end of the rotation. Faculty recognize that course work grades are important, and some leniency regarding time in the lab is encouraged at exam time. Furthermore, faculty should remember that students on TA's often have exams to grade in the classes they teach.

At the end of each rotation, the student and faculty member must both complete the rotation evaluation form and discuss the student's performance. PDF fill-able rotation evaluation forms are available on the CVM J drive, SMB-Graduates folder. These evaluations will be used during the annual review of each first year student.

2. COURSEWORK AND RESEARCH

In both the M.S. and Ph.D. programs, faculty members guide the graduate study of each student. While doing rotations, that guidance is provided by the faculty on the SMB-GAC. The student's thesis/dissertation committee provides this guidance thereafter. Together, the faculty and the student design an appropriate academic program, comprising both course work and research, within the framework of the Graduate School's requirements for academic residency, examinations, and the thesis/dissertation. A student is recommended for the M.S. or Ph.D. degree when his/her committee members agree that the appropriate level of achievement has been reached in the research area under study, the student has completed sufficient graded coursework with a 3.0 GPA (out of 4.0) in core courses, and when the Graduate School regulations regarding thesis/dissertation preparation have been satisfied. It is the Graduate School policy that thesis M.S. degrees require 21 graded (A to F) credit hours (15 graded credit hours at the 500 level) and that the Ph.D. degree requires a minimum of 15 graded (A to F) credit hours at the 500 level. Typically, SMB Ph.D. students do 21 graded credit hours to increase their knowledge base and to aid with their research. For research, the M.S. and Ph.D. students enroll in MBioS 700 and MBioS 800, respectively. MBioS 700 and MBioS 800 are graded satisfactory/unsatisfactory (S/U), but are not counted toward graded (A to F) credit hours.

It is of primary importance for each student to demonstrate early potential and commitment to both research and academic achievement. Without research accomplishments, an advanced research degree in Molecular Biosciences cannot be obtained regardless of excellent grades. Likewise, a student cannot remain in good standing in SMB without a 3.0 GPA (out of 4.0) in core, didactic coursework. Through experience, students have learned that studying together in small groups on a regular basis with other students in the course is an effective way to succeed in graduate-level courses.

3. GRADUATE ASSISTANTSHIPS

Graduate students are appointed on 0.5 FTE (full-time equivalent) academic-year graduate assistantships. This appointment usually includes payment of tuition, a 12-month stipend, and comprehensive health insurance coverage. Students who remain in good academic standing and make satisfactory progress toward their degree will be provided with continual support as either a TA or RA for a period up to three or five years for M.S. and Ph.D. students, respectively. For technical, administrative reasons, students are appointed to half-time assistantships; however, graduate education is a full-time career, and students are expected to fulfill all responsibilities required for a timely completion of their M.S. or Ph.D. degree, including taking courses, meeting teaching requirements, and conducting thesis research. Graduate students are strongly discouraged from accepting paid employment outside of the School to assure that they complete their programs in a timely manner.

4. TEACHING REQUIREMENT

Teaching is considered an integral part of the graduate experience and training in the MB Graduate Program. All students are required to serve as a teaching assistant for a minimum of one semester, while concurrently doing more than 20 hrs/week of research. Additionally, we encourage students to serve as a teaching assistant for a second semester during the course of their graduate career, if time allows. The responsibilities associated with a TA should not take more than 20 hrs/week, including class contact hours as well as time for preparation and cleaning up labs, writing and grading quizzes and exams, grading notebooks, etc. The SMB Associate Director for Graduate Studies makes the teaching assignments for undergraduate biochemistry, genetics, microbiology or general biology and chemistry courses. Students are strongly recommended to attend TA training sessions, which are provided during

fall orientation. At the end of the teaching semester, the student and TA supervisor must both complete the TA evaluation form and discuss the student's performance and sign. PDF fill-able TA evaluation forms are available on the CVM J drive, SMB-Graduates folder. These evaluations are included in the annual review documents.

5. SEMINARS AND FACULTY RESEARCH SEMINARS

All graduate students are required to attend two weekly seminars: a Tuesday seminar for graduate student presentations and a Thursday seminar for invited speakers who are experts in their fields. Attendance will be taken for all students and absences will be noted at the annual review. The students who will be presenting enroll in MBioS 579, a S/F course, not counted toward graded credits (guidelines for seminar presentation in Section E). During fall terms, first year and presenting students will stay after seminars with a few faculty to provide constructive criticism (what went well and what needs improvement) and during the spring terms, presenting students stay with the faculty to critique their presentations. Students in the M.S. program are required to present one seminar on a literature topic. Students in the Ph.D. program are required to present three seminars. The first seminar is generally on a literature topic; the second seminar will be part of the student's preliminary examination and will describe their research. The third seminar can be on either their research or a literature topic, although students are encouraged to talk about their research. After the outside speaker seminars on Thursday, there is usually lunch for graduate students and postdoctoral fellows. These lunches provide an opportunity for students to meet well-respected scientists and make contacts regarding their current research as well as later postdoctoral opportunities. Public seminars will be required as part of the final examination for M.S. and Ph.D. degrees. These final public seminars do not count toward fulfillment of the MBioS 579 requirements.

6. SELECTION OF THESIS/DISSERTATION ADVISOR

For assignment to a laboratory for thesis research after their third rotation, students are strongly recommended to contact at least two potential PI/lab homes with whom they have discussed the possibility of thesis work before submitting a preference list to the SMB Associate Director for Graduate Studies. The Associate Director for Graduate Studies and the SMB Director will review the preference lists and make final assignments to thesis labs. Whenever possible, students will be assigned to their first choice. However, in some cases, limited space or research funds may make a different choice more appropriate. If for any reason the student or faculty member wishes to subsequently alter this assignment, this process may be initiated by submitting a written request to the SMB Associate Director for Graduate Studies.

Faculty trainer for the MB graduate students can be a member of the SMB tenure-track or tenured faculty or an SMB associate faculty. A list of faculty trainers is included in this handbook.

Responsibilities of a faculty trainer for the MB graduate students include:

- Having an active, funded research program and making contributions to the peer-reviewed literature.
- Providing funding for a student's thesis/dissertation research, including supplies, reagents and equipment.
- Accepting Ph.D. students into his/her laboratory only with the good faith intention of providing continued RA funding as long as the student is making satisfactory progress toward his/her degree. In the event the trainer encounters unexpected, interrupted funding, he/she should notify the SMB

Associate Director for Graduate Studies in a timely manner. The school will provide advanced students with TA funding so that the student's progress toward a degree is uninterrupted. Most M.S. students will be supported on TA funding.

- Providing summer support for both M.S. and Ph.D. students at the financial support level specified by the policies of SMB.

Mentoring activities strongly recommended for a faculty trainer for the MB graduate students include:

- Interacting with each student on a regular basis to supervise the student's thesis research and actively guiding each student through the Molecular Biosciences Graduate Program and the Graduate School requirements in a timely manner. This guidance includes making sure that his/her student has regular thesis committee meetings, particularly before the faculty annual review of graduate students in May.
- Participating in graduate student recruiting activities and the annual review of graduate students. The trainer is also encouraged to attend SMB student seminars, especially when their student is presenting, as well as outside speaker seminars and participate in other SMB activities that promote the education of MB graduate students, such as the annual retreat. Furthermore, the graduate trainer will strongly encourage their MB graduate students to participate in all SMB activities, such as seminars, graduate student recruiting, MBGSA activities, the annual retreat and other scholarly and social activities sponsored by the school.

7. SELECTION OF THESIS/DISSERTATION COMMITTEE

Toward the end of their first year or the beginning of the summer, students should choose their thesis/dissertation committee members. The student and his/her advisor jointly determine a student's committee make up. The committee should consist of at least four WSU faculty members for both the thesis M.S. and Ph.D. students. The committee must be chaired by a SMB Tenured or Tenure-track (Core) Faculty or an SMB Associate Faculty. At least three members of the committee must be SMB Tenured or Tenure-track Faculty or SMB Associate Faculty. At least two members of the committee must be SMB Core Faculty. WSU clinical faculty may be a member of thesis and dissertation committees if they are approved as graduate faculty in their own program, however, they shall not constitute more than one quarter of the committee membership (if a committee has four members, only one member may be a non-tenure track faculty member). If two members of the committee are married to each other, an additional member is required. Experts outside of WSU and faculty from other institutions may serve on committees as a fifth member. In this case, 'External Committee Member Request Form' accompanied by the curriculum vitae of the proposed individual must be provided to the SMB Associate Director of Graduate Studies. In unusual situations, a research assistant professor or other senior scientist from the PI's lab may serve as an additional member of a committee, in an unofficial, non-voting capacity (not listed in the Committee Request Form or on the Program of Study). The approval of the committee's membership is at the discretion of the SMB Associate Director for Graduate Studies, who must sign the Graduate School form(s), and submit the materials to the Dean of Graduate School for final approval, on behalf of SMB.

8. SUBMISSION OF PROGRAM OF STUDY

Students should submit their Program of Study when they defend their first proposal (see below), usually in the fall of their second year (i.e., their third semester) on forms provided by the Graduate School (online at <http://gradschool.wsu.edu/Forms/>). The completed Program of Study should be signed by the

thesis committee members at the first proposal defense. After approval from the SMB Associate Director for Graduate Studies, the Graduate Academic Coordinator will submit the Program of Study to the Graduate School for final approval, which can take up to eight weeks. For M.S. students, the Program of Study must be approved by the Graduate School no later than the beginning of the semester proceeding the semester of graduation. For Ph.D. students, the Program of Study must be approved by the Graduate School a minimum of one term before the scheduling of their Preliminary Examination (the Second Proposal). Any changes in the Program of Study must be approved by the members of the thesis committee, the SMB Associate Director for Graduate Studies and the Graduate School. The requirements for graduation are those in effect in the Program of Study and any approved changes.

Credit Requirements for a Thesis Master's Degree in Molecular Biosciences

- Minimum 30 hours of total credits with a minimum 3.0 GPA+
- Minimum 21 hours of graded (A to F) credits; fifteen of which must be at the 500-level*
- Six graded credit hours maximum can be at the 300- and 400-level.≠
- Minimum 4 credit hours of MBioS 700; two of which must be taken in the final semester.

Credit Requirements for a Doctoral Degree in Molecular Biosciences

- Minimum of 72 hours of total credits with a minimum 3.0 GPA+
- Minimum of 15 hours of graded (A to F) credits at the 500-level*
- Recommend 21 hours of graded credits (6 hours maximum can be at the 300 and 400-level≠).
- Minimum 20 credit hours of MBioS 800; two of which must be taken in the final semester.

+Audited courses are not recorded on the Program of Study.

*Online courses are not allowed for students on Pullman campus

≠For a total of >24 graded credit hours, 9 graded credit hours at the 300- or 400-levels are allowed

9. RESEARCH PROPOSALS AND PRELIMINARY EXAMINATION

Students should follow the guidelines in Section F for the First and Second Proposals. The objective of the first research proposal is to provide a process that: 1) enables the student to become familiar with the literature and major issues of her/his research area; 2) encourages the student to think creatively about experimental design and methodological approaches to his/her research; 3) introduces the student to the art of proposal writing; and 4) provides an opportunity for interaction with the thesis/dissertation committee and other faculty so they can learn about the student's strengths and provide advice about their weaknesses. Both thesis M.S. and Ph.D. students must do the First Proposal.

The second research proposal is required for Ph.D. students and is usually on the topic of the student's dissertation research project. The objective of the Second Proposal is to provide a mechanism to: 1) test the student's ability to design and conduct experiments and collect preliminary data; 2) develop "second generation" hypothesis and experiments; 3) design a longer range project; and 4) provide an opportunity to hone student's skills in the art of proposal writing. This proposal and its defense is also the preliminary examination, an official Washington State University examination for advancement to Ph.D. candidacy. The official forms to schedule this exam must be submitted to the Graduate School at least 10 working days before your examination.

10. EXPECTATIONS FOR COMMITTEE MEETINGS

For each committee meeting (excluding proposal defenses), the student should prepare a research progress report. The report must detail what they proposed to accomplish, what they have accomplished and their future directions and goals. A bulleted, outline format is acceptable. For the annual spring committee meeting, this progress report is typically part of the annual review form.

After each meeting, the chair, in consultation with the committee, will briefly document the results of the meeting, using the context of the student's progress report. Ideally, the committee documentation should be done at the meeting or immediately afterward. The final version of this document will be provided to the student and each committee member. Copies of the student's progress report and the committee post-meeting assessment will be given to the Graduate Academic Coordinator for inclusion in the student's file. Again, for annual spring committee meetings, these documents are generally part of the annual review form.

11. ANNUAL REVIEW OF GRADUATE STUDENTS

The student's thesis/dissertation committee should meet, at a minimum, annually. This meeting is usually during spring semesters to review and provide constructive advice to enhance the training experience to students. This review should be done prior to the faculty's annual review of graduate students each spring. All graduate students are required to complete the Graduate Student Annual Review form (see Section G). The first year students still doing lab rotations in the spring semester must complete all lab rotation evaluations. The annual review form, as a PDF fill-able form, is available on the CVM J drive, SMB-Graduates Folder. Shortly after the end of the spring semester, the performance of each student is reviewed annually at a faculty meeting of the SMB core faculty and the Associate Faculty and the students are informed about the outcome of this review by a letter from the SMB Associate Director for Graduate Studies. Students may be terminated from the Program for poor classroom performance or for failure to meet School standards in research, seminars, or other types of exams at the annual review meeting. The following recommendations will be made: **satisfactory performance**, recommending continued enrollment; **satisfactory performance with deficiencies**, specifying conditions to be met for continued enrollment; and **unsatisfactory performance**, recommending dismissal from the program.

12. FUNDING EFFORT CERIFICATION

WSU has been directed by the Washington State Auditor's Office that each student and supervisor (if a TA, then your TA class supervisor; if on RA or Training Grant, then your PI) must complete a Funding Effort Certification Form for each semester. Two forms, one for fall semester and the other for spring semester are included with the Annual Review Packet.

13. THESIS/DISSERTATION REQUIREMENT

The expectations for a M.S. thesis are the completion of a body of research equivalent to one first author manuscript. The expectations for a Ph.D. dissertation are two first author manuscripts. Ideally, the manuscripts should be submitted for publication in a peer-reviewed journal prior to the final thesis or dissertation defense.

The thesis/dissertation should consist of an abstract, an introductory chapter, research chapters and a final discussion chapter. The introduction should present a review of the state of knowledge in the relevant fields of study and outline how the research contained in the thesis advances the field. The research chapters can be presented as manuscripts, using the format of the journal to which the manuscript has been or will be submitted. The final discussion chapter should integrate the conclusions of the research

chapters and suggest future directions for the work. Information on thesis and dissertation formats can be found at the Graduate School website, <http://gradschool.wsu.edu/Forms/>. A copy of the thesis/dissertation must be submitted to the members of the thesis committee, the Graduate School, the SMB Academic Office in Biotechnology/Life Sciences 102 at least 10 working days before the final examination. In addition, Ph.D. candidates must upload an electronic format (PDF) copy of their dissertation to UMI/Proquest 10 working days before their final examination.

14. FINAL EXAMINATION AND PUBLIC SEMINAR

After approval of the thesis or dissertation by the student's committee, students must schedule the final examination with their committee members and give notification (through a scheduling form) to the Graduate School at least 10 working days before the final examination. Public seminars are required as part of the final thesis/dissertation defense. After the public seminar, there is an examination by the student's committee and any interested faculty members; this session should be scheduled for two hours in duration, and is limited to two and one-half hours. All faculty members can attend, but only members of the thesis/dissertation committee and graduate student training faculty officially approved by the Graduate School can vote by secret ballot, seen only by the Graduate School liaison. If any student or faculty wishes to have a Graduate Mentor Fellow from the Graduate Mentor Academy present during the final examination, they may ask for one through the Graduate School. A brief rationale for the request is usually required. In the event the student does not pass the final examination, he or she may be allowed to re-take the final examination after a lapse of three months. A Graduate Mentor Fellow from the Graduate Mentor Academy will automatically be appointed to attend the repeated final examination.

After successful completion of the final examination, M.S. students must submit their thesis within five working days in electronic format (PDF) to grad.programs@wsu.edu. Ph.D. students must upload their final dissertation to UMI/Proquest within five working days of the examination. In addition, the candidates must submit one paper copy of the title page, abstract, and original signature page—on 100% cotton paper to the Graduate School. Signatures must be in black ink. Students should also provide copies of the final thesis or dissertation to the School of Molecular Biosciences and the chair of his/her committee.

15. CHANGE FROM M.S. TO PH.D. PROGRAM

A student wishing to change from a M.S. program to a Ph.D. program must receive approval from the SMB-GAC and the SMB Associate Director for Graduate Studies, who will make a recommendation to the Graduate School to alter the student's status. ***Before the end of the first year***, the student should discuss this change in status with the SMB Associate Director for Graduate Studies and then submit a written request that includes a transcript of work completed at WSU and a reason for the request to change programs. The student is required to be in good standing with at least a 3.0 GPA to be considered. The SMB Associate Director for Graduate Studies will bring this information to the SMB-GAC for its consideration. ***After the first year***, the student must obtain a recommendation from his/her thesis committee for a change in status. The chair of the thesis committee should send a memo to the SMB Associate Director for Graduate Studies requesting this change, with appropriate rationale. The SMB Associate Director for Graduate Studies will provide this information and a copy of the student's transcript to the SMB-GAC for its consideration.

16. TYPICAL TIMELINE OF Ph.D. GRADUATE PROGRAM

FIRST YEAR

A. FIRST SEMESTER

- Course registration: Sign up for 6-9 graded credits and MBioS 800 credits. The credits from the graded courses and MBioS 800 (satisfactory/unsatisfactory, S/U) should add to a total of 12 credits
- Seminars: Must attend SMB student and invited speaker seminars (Tuesdays and Thursdays, at noon).
- Two 8-week lab rotations: Complete rotation evaluation form for each.

B. SECOND SEMESTER

- Course registration: Sign up for 6-9 graded credits, 1 credit of MBioS 579 for a seminar presentation, and MBioS 800 credits. The credits from the graded courses, MBioS 579 (satisfactory/fail, S/F), and MBioS 800 (S/U) should add to a total of 12 credits
- Seminars: Must attend SMB student seminars and invited speaker seminars. Present a literature seminar for MBioS 579.
- Third 8-week lab rotation and an optional fourth lab rotation: complete rotation evaluation form.
- Selection of thesis advisor: Submit a preference list of two potential dissertation advisors after the third or fourth lab rotation.
- Complete Funding Effort Certification form for both the first and the second semesters

C. SUMMER

- Course registration: Sign up for 3 credits of MBioS 800 (S/U) if you know you are on an RA or a TA. If you are uncertain, check with the Graduate Academic Coordinator.
- Research: The summer is the first opportunity for most students to carry out research that will count towards her/his degree without the interruptions of classes. Students are encouraged to make the most of this time to collect preliminary data as well as plan and write their first research proposal.
- Choose dissertation committee members – at least four faculty members, including your advisor. Two members must be SMB core faculty.
- Optional to have a committee meeting.

SECOND YEAR

A. THIRD SEMESTER

- Course registration: Sign up for ~3 graded credit hours (students are encouraged to have a total of 21 graded credits), 2 credits of MBioS 593 for the first proposal, and MBioS 800 credits. The credits from the graded courses, MBioS 593 (S/F) and MBioS 800 (S/U) should add to a total of 12 credits
- Seminars: Required to attend SMB student seminars and invited speaker seminars
- First research proposal: Follow the MB Graduate Program Guidelines for Proposals and Guidelines for Proposal I in Section F.

- Prepare the "Program of Study" and have it checked by the Graduate Academic Coordinator. At the first proposal defense, have it signed by the dissertation committee members. Deliver the signed document to the Graduate Academic Coordinator. After an approval signature from the SMB Associate Director for Graduate Studies, Graduate Academic Coordinator will submit the Program of Study to the Graduate School for the final approval.

- Teaching, if applicable

B. FOURTH SEMESTER

- Course registration: Sign up for ~3 graded credit hours (students are encouraged to have a total of 21 graded credits) and MBioS 800 credits. The credits from the graded courses and MBioS 800 (S/U) should add to a total of 12 credits
- Seminars: Required to attend SMB student seminars and invited speaker seminars.
- Teaching, if applicable
- Conduct annual research review meeting with student's dissertation committee
- Complete Annual Review Form, which includes research review, Funding Effort Certification for both fall and spring semesters, and teaching review for fall and/or spring semesters, if applicable.

C. SUMMER

- Course registration: Sign up for 3 credits of MBioS 800 (S/U) if you know you are on an RA or a TA. If you are uncertain, check with the Graduate Academic Coordinator.
- Students are encouraged to make the most of this time to collect preliminary data as well as plan and write their second research proposal.

FIFTH SEMESTER IN THE THIRD YEAR

- Course registration: Enroll in 1 credit of MBioS 579 for the second seminar and MBioS 800 (S/U). The credits should add to a total of 12 credits
- Seminars: Required to attend student seminars and invited speaker seminars. Enroll 1 credit in MBioS 579 (S/F) and present the second seminar as part of Preliminary Examination
- Prepare second proposal, which is part of the official "Preliminary Examination" scheduled through the Graduate School. Follow the MB Graduate Program Guidelines for Proposal and Guidelines for Proposal II in Section F.

SIXTH SEMESTER, AND SUBSEQUENT SEMESTERS

- Course registration: The credits from the graded courses and MBioS 800 (S/U) should add up to a total of 12 credits during fall and spring semesters. Sign up for 3 credits of MBioS 800 (S/U) if you know you are on an RA or a TA. If you are uncertain, check with the Graduate Academic Coordinator.
- If all graded course work is completed and the student is supported by an RA from an external federally funded grant, student is eligible for an ABD (all-but-dissertation) tuition waiver. Work with the Graduate Academic Coordinator to file the appropriate paperwork with the Graduate School.

- Seminars: Required to attend SMB student seminars and invited speaker seminars. Enroll in 1 credit of MBios 579 (S/F) for presentation of the third seminar in the fourth or fifth year (at least one semester prior to graduation semester).
- Teaching, if applicable
- Conduct annual research review meeting with student's dissertation committee in spring semesters
- Complete in spring semesters the Annual Review Form, which includes research review, Funding Effort Certification for both fall and spring semesters, and teaching review for fall and/or spring semesters, if applicable.
- Students who have passed their Preliminary Exam are eligible for an SMB-sponsored travel fellowship. Student will receive a one-time \$1000 award to attend a conference or workshop of their choice. Requirements are that students participate in a workshop or present at a conference and that their research advisor approve the conference or workshop.

FINAL SEMESTER

- Check with the Graduate Academic Coordinator for enrollment requirement for MBioS 800 (S/U).
- Seminars: Required to attend SMB student seminars and invited speaker seminars
- Teaching, if applicable
- The beginning of the semester in which you graduate, apply for graduation through the Graduate School and pay your \$50 graduation fee (see graduation checklist for deadline dates).
- Schedule the public defense seminar and dissertation examination with committee members and through the Graduate School. At least 10 working days prior to your dissertation defense, submit the signed Dissertation/Thesis Scheduling Form to the Graduate School as well as upload your final draft of dissertation in a PDF format to UMI/Proquest at website <http://www.dissertations.wsu.edu/>.
- Within five working days after the defense, submit your digital dissertation in an appropriate electronic format (PDF) to the thesis/dissertation website and the appropriate hard copies to the Graduate School. In addition, students should provide copies of the dissertation to the School of Molecular Biosciences and to the chair of his/her committee.

17. TYPICAL TIMELINE OF THESIS M.S. GRADUATE PROGRAM

FIRST YEAR

A. FIRST SEMESTER

- Course registration: Sign up for 6-9 graded credits and MBioS 700 credits. The credits from the graded courses and MBioS 700 (satisfactory/unsatisfactory, S/U) should add to a total of 12 credits
- Seminars: Required to attend SMB student and invited speaker seminars (Tuesdays and Thursdays, at noon).
- Two 8-week lab rotations: complete rotation evaluation form for each.
- Serve as a Teaching Assistant.

B. SECOND SEMESTER

- Course registration: Sign up for 6-9 graded credits, 1 credit of MBioS 579 for a seminar presentation, and MBioS 700 credits. The credits from the graded courses, MBioS 579 (satisfactory/fail, S/F), and MBioS 700 (S/U) should add to a total of 12 credits
- Seminars: Required to attend SMB student seminars and invited speaker seminars and present a literature seminar. Present a literature seminar for MBioS 579.
- Third 8-week lab rotation and an optional fourth lab rotation: complete rotation evaluation form.
- Selection of thesis advisor: Submit a preference list of two potential dissertation advisors after the third or fourth lab rotation.
- Serve as a Teaching Assistant.
- Complete Funding Effort Certification form for the first and the second semesters.

C. SUMMER

- Course registration: Sign up for 3 credits of MBioS 700 (S/U) if you know you are on an RA or a TA. If you are uncertain, check with the Graduate Academic Coordinator.
- Research: The summer is the first opportunity for most students to carry out research that will count towards her/his degree without the interruptions of classes. Students are encouraged to make the most of this time to collect preliminary data as well as plan and write their first research proposal.
- Choose dissertation committee members – at least four faculty members, including your advisor. Two members must be SMB core faculty.
- Optional to have a committee meeting.

THIRD SEMESTER IN THE SECOND YEAR

- Course registration: Sign up for 3-6 graded credit hours, 2 credits of MBioS 593 for the first proposal, and MBioS 700 credits. The credits from the graded courses, MBioS 593 (S/F) and MBioS 700 (S/U) should add to a total of 12 credits
- Seminars: Required to attend SMB student seminars and invited speaker seminars
- First research proposal: Follow the MB Graduate Program Guidelines for Proposals and Guidelines for Proposal I in Section F.

- Prepare the "Program of Study" and have it checked by Graduate Academic Coordinator. At the first proposal defense, have it signed by the dissertation committee members. Deliver the signed document to the Graduate Academic Coordinator. After an approval signature from the SMB Associate Director for Graduate Studies, the Graduate Academic Coordinator will submit the Program of Study to the Graduate School for the final approval.
- Teaching, if applicable

FOURTH SEMESTER, AND SUBSEQUENT SEMESTERS

- Course registration: Complete a minimum of 21 graded credits. The credits from the graded courses and MBioS 700 (S/U) should add to a total of 12 credits during fall and spring semesters. Sign up for 3 credits of MBioS 700 (S/U) if you know you are on an RA or a TA in the summer. If you are uncertain, check with the Graduate Academic Coordinator.
- Seminars: Required to attend SMB student seminars and invited speaker seminars
- Teaching, if applicable
- Conduct annual research review meeting with student's thesis committee in spring semesters
- Complete in spring semesters Annual Review Form, which includes research review, Funding Effort Certification for both fall and spring semesters, and teaching review for fall and/or spring semesters, if applicable.

FINAL SEMESTER

- Check with the Graduate Academic Coordinator for enrollment requirement for MBioS 700 (S/U).
- Seminars: Required to attend SMB student seminars and invited speaker seminars
- Teaching, if applicable
- The beginning of the semester in which you graduate, apply for graduation through the Graduate School and pay your \$50 graduation fee.
- Schedule the public seminar and thesis examination with thesis committee members and through the Graduate School. At least 10 working days prior to your thesis defense, submit the signed Dissertation/Thesis Scheduling Form with a final draft of your thesis to the Graduate School.
- After the defense, within five working days, submit your digital thesis in an appropriate electronic format (PDF) to the thesis/dissertation website: <http://www.dissertations.wsu.edu/> and the appropriate hard copies to the Graduate School. In addition, students should provide copies of the thesis to the School of Molecular Biosciences and to the chair of his/her committee.

D. REQUIRED, RECOMMENDED, and ELECTIVE COURSES FOR GRADUATE STUDENTS

1. REQUIRED COURSES				
<ul style="list-style-type: none"> ▪ 7 graded credit hours of coursework required ▪ One and 3 credits of MBioS 579 required for M.S and Ph.D. students, respectively. ▪ Research Proposal II is required for only Ph.D. students. 				
MBioS 503	Molecular Biology	Fall	3 cr hr	Graded
MBioS 563	Deconstruction of Research	Fall	3 cr hr	Graded
MBioS 564	Biomedical Experimentation: Philosophy of Experimental Design	Spring	1 cr hr	Graded, 1 st modular period
MBioS 579	Molecular Biosciences Seminar	All	1 cr hr	S/F
MBioS 593	Research Proposal I	All	2 cr hr	S/F
MBioS 800	Research Proposal II	All	1 cr hr	S/U
MBioS 700	Master's Research & Exam At minimum 4 hrs required	All	>4 cr hr	S/U
MBioS 800	Doctoral Dissertation & Exam. At minimum 20 hrs required	All	>20 cr hr	S/U

2. RECOMMENDED COURSES				
<ul style="list-style-type: none"> ▪ Recommend 7 graded credit hours 				
MBioS 513	General Biochemistry I	Fall	3 cr hr	Graded
MBioS 525	Advanced Topics in Genetics: Genetically Modified Organisms	Spring	1 cr hr	Graded, modular period
MBioS 525	Advanced Topics in Genetics: Genes, Genomes, and Society	Spring	1 cr hr	Graded, modular period
MBioS 529	Selected Topics in Cell Biology: Molecular Signaling Mechanisms	Spring	1 cr hr	Graded, modular period
MBioS 529	Selected Topics in Cell Biology: Membrane & Intracellular Trafficking	Spring	1 cr hr	Graded, modular period

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3. ELECTIVE COURSES

- Recommend 7 graded credit hours

MBioS 501	Cell Biology	Spring	3 cr hr	Graded
MBioS 514	General Biochemistry II	Spring	3 cr hr	Graded
MBioS 528	Molecular and Cellular Reproduction	Fall Even	3 cr hr	Graded
MBioS 540	Immunology	Fall	3 cr hr	Graded
MBioS 542	General Virology	Spring	3 cr hr	Graded
MBioS 548	Selective Topics in Immunology & Virology: Immunopathology	Fall	1 cr hr	Graded
MBioS 549	Seminar in Immunology	Spring	1 cr hr	Graded
MBioS 550	Microbial Physiology	Spring	3 cr hr	Graded
MBioS 564	Biomedical Experimentation: Analysis--Biomedical Experiment	Fall	1 cr hr	Graded, modular period
MBioS 564	Biomedical Experimentation: Imaging	Fall	1 cr hr	Graded, modular period
MBioS 574	Protein Biotechnology	Spring Even	3 cr hr	Graded
MBioS 578	Bioinformatics	Fall	3 cr hr	Graded
Biology 537	Plant Cell Biology	Spring	3 cr hr	Graded
Biology 575	Systems Biology of Reproduction	Spring Odd	2 cr hr	Graded
Biology 576	Epigenetics and Systems Biology	Spring Even	3 cr hr	Graded
Chem 543	Bioorganic Chemistry	Spring	3 cr hr	Graded
Chem 572	Enzyme Reaction Mechanisms	Fall	3 cr hr	Graded
E MIC 586	Special Projects in Electron Microscopy	Fall/Spring	V cr hr	Graded

E MIC 587	Special Topics in Electron Microscopy	Fall/Spring	1 cr hr	Graded
Neuro 541	Special Topics in Cellular & Molecular Neuroscience: Signal Transduction	Spring	1 cr hr	Graded, 2 nd modular period
Phil 530	Bioethics	Fall	2 cr hr	Graded
Stat 412	Statistical Methods in Research I	All	3 cr hr	Graded
Stat 512	Analysis of Variance of Designed Experiments	Fall/Spring	3 cr hr	Graded

4. WEB-BASED COURSES ONLY ACCESSIBLE TO STUDENTS AT THE VANCOUVER AND SPOKANE CAMPUS

Biol 576	Epigenetics and Systems Biology	Spring	3 cr hr	Graded
MBioS 501	Cell Biology	Fall/Spring	3 cr hr	Graded
MBioS 503	Molecular Biology	Fall/Spring	3 cr hr	Graded
MBioS 513	General Biochemistry I	Fall	3 cr hr	Graded
MBioS 578	Bioinformatics	Fall	3 cr hr	Graded
Phil 530	Bioethics	Fall	2 cr hr	Graded
Stat 412	Statistical Methods in Research I	Fall	3 cr hr	Graded
Stat 512	Analysis of Variance of Designed Experiments	Spring	3 cr hr	Graded

E. SEMINAR INFORMATION (M BIOS 579)*

1. Content and Purpose

A. Seminar content and Scheduling

- Your first seminar will be on a paper from the literature.
- Ph.D. students will present two more seminars. Your second seminar will be on your research, and your third one, usually on your research.
- Schedule your seminar with Graduate Academic Coordinator in BLS 102. Make sure you schedule your seminar when your thesis advisor can be in attendance.

B. Purpose: Training

- Most information in modern biological science is communicated verbally.
- Throughout your career you will be evaluated continually; an important aspect of those evaluations are judgments of your seminar presentations.
- There is a strong link between the ability to give a good seminar and being a good teacher.

C. Purpose: Source of information

- Listening to a good seminar is the most time-efficient way to stay abreast of new developments in a wide range of fields.
- There is always a distinct possibility that you will hear about a specific approach, technique or result that will be of direct application to your own work, even if the topic of the seminar is distant from your own interests.

2. General

- A. You are required to attend all SMB seminars throughout your graduate career. Attendance will be taken for all students. Absences will also be noted at the annual review.
- B. As described in the next two sections, all seminar topics must be approved by a cognizant faculty member (advisor, rotation supervisor or course coordinator) at least Four weeks prior to your seminar.
- C. The allotted time for each seminar is 25 minutes for the talk (although 20 minutes is preferred) and 5 minutes for questions. You will be cut off if you exceed this time.
- D. All students in attendance will list their names on the sign-in sheet.
- E. Fall terms, first year and presenting students will stay after seminars with a few faculty to provide constructive criticism (what went well and what needs improvement) and during the Spring terms, presenting students stay with the faculty to critique their presentations.

3. Getting Started: Literature Seminars

- A. Pick your paper early. The following time table is suggested, especially for first-year students. This is often the hardest part. The course coordinator is available for consultation as are your advisor or rotation supervisor and other faculty. But, do not expect them to do your job.
 - You should be reading current literature at all times.

- At least four weeks prior to your seminar, select two or three possible papers. If you are associated with a group, talk to the cognizant faculty member (advisor or rotation supervisor). The course coordinator is also available for consultation.
 - At least three weeks prior to your seminar make a final choice of paper and outline the talk. Consult with your advisor or rotation supervisor. After providing the title and outline, seek approval from either the course coordinator or (preferably) from your advisor or rotation supervisor. This assures that the major paper was recently published (typically within the past year) and is both interesting and of good quality. Begin practicing.
 - Two weeks prior to your seminar, give the title and summary to the Graduate Academic Coordinator in BLS 102, for the seminar announcement. Announcements are posted for the public at least 10 working days in advance of your seminar.
- B. Pick a good paper aimed at a general molecular biosciences audience. It is easier to give a good talk about good work. The preferable papers are those with a direct story. While there is sometimes good work in obscure journals, it is best to pick from mainline journals such as: Nature, Science, Biochemistry, Journal of Bacteriology, Journal of Biological Chemistry, Molecular Microbiology, PNAS, and Cell. With rare exceptions, you should start with the assumption that the paper is good and the conclusions sound.
- C. Read the related literature. Do not expect to be able to have to read only your paper. You will have to read background material, but only present one (or perhaps two) paper(s). You should be the "local expert" for one day on this subject. You may include some related references on your seminar announcement.
- D. Outline your talk. You need to decide what to cover and what extra material you will need to include. Decide which tables and figures to present. Not all data given in the paper may be relevant.

4. Getting Started: Research Seminars

- A. Decide what you want to present. Your research may be well underway or it may be hardly underway. You should not be too concerned with this, but make sure you are selective about which data you present. We do not need to hear about all of your failed experiments. Discuss with your advisor a broad outline of your proposed seminar.
- At least three weeks prior to your seminar make an outline of your talk. Consult with your advisor and obtain approval for the seminar topic. Begin practicing.
- B. TWO WEEKS prior to your seminar, give the title and summary to the Graduate Academic Coordinator in BLS 102, for the seminar announcement. Announcements are posted for the public at least 10 working days in advance of your seminar.
- C. Remember that not everyone is familiar with the background of your research. If you do not explain its purpose by giving sufficient background in a broader context, then it is hard to get excited about your research. But, on the other hand, do not allow the introduction to drag on for most of the talk.
- D. Make sure you grasp the literature relevant to your research.
- E. Outline your talk. You need to decide what to cover and what extra material you will need to include. Decide which tables and figures to present. Not all data obtained during your research will be relevant.

5. Organization of Your Seminar

- A. Logic. The basic secret of good organization is to elucidate the logic of the paper. If there is no apparent logic, the topic is a poor choice.
- B. Seminar structure. Your talk should generally have the following sections (you may change the order to fit your style):
- Title page - Include the title and full journal reference for the paper as well as your name. If it is a research seminar, include the name of the head of the research group.
 - Introduction – Include biological motivation and relevance. i.e., why should people listen to this talk? Put the work in context of a wider scope of the field. Also, give background information necessary to understand the paper. This section often requires considerable reading beyond the paper. Remember you are addressing a general audience, not a group of your lab mates.
 - Hypothesis and Conclusion - The purpose of the early slides is to give direction to your talk. Describe briefly what the problem is, why it is significant, and how you or the authors go about solving it. You will include the hypothesis or aim of the study in one of the early (perhaps the second) slides. In addition, it is generally best for both speaker and listeners to have an early (perhaps the third) slide show a summary of the conclusions. This focuses attention of the audience in the direction your presentation will take and allows them to more readily evaluate the experimental basis for the conclusions that you have already shown and will show again at the end. There are times when you may wish to pull a surprise at the end of a talk, but these cases are so rare that it is best to get in the habit of an early summary of conclusions.

NOTE: The next two items may be combined, but the most important point is to explain how the authors got from the original logic to the conclusion.

- Methods - Describe experimental methods. If you do not understand them, read the literature and talk to faculty or students.
- Results – Be selective. Present what is relevant to the original aim. You generally should not show every detail in a paper or in your research.
- Future directions and/or critique (optional, but include it anyway) - If you find that the work is not as definitive as you would prefer, you may suggest further experiments that could be done. Also, if you find some problems with what was done, you should note them. If there are too many problems or loose ends, choose a better paper.
- Summary – You should be able to say how the results support the conclusion; i.e., summarize:
 - logic
 - the path from problem to conclusion
 - significance
- It should be obvious by this point in the seminar that your presentation is finished. Include one or two concluding oral sentences to bring the audience back down to earth. i.e., you should not end with: "That is all I have to say. Any questions?" Be snappier than that.

C. General Style

- Emphasize important points by showing them in slides and/or repeating them in mini-summaries.
- Make sure that even people far from the field come away feeling they have learned something new. This means pick a good paper, but also make sure that the main message comes across.
- Continually explain what is being done and why; redundancy is not always bad.
- The logic of a study and the implications of the results are more important than a list of all the data. It is an art to present enough critical data in an appropriate form to convince the audience that the experiments are well done and the data convincing without boring them.

D. Presentation level. Present your seminar so that new inexperienced SMB graduate students can understand it. Remember that these people have different backgrounds than yours; avoid jargon or excessive acronyms.

6. Presentation

A. Design a clear PowerPoint presentation.

- Text should be readable from the back of a small auditorium. Perhaps the cardinal sin in slides and overheads is use of fonts that are too small. For medium-sized lecture halls, use at least 24 font. This restricts the amount of material that can be shown in one slide, but that is an advantage. Use only fonts without serifs; they are clearer in slides. It is recommended that you Never make the all-too-common statement: "I know you can't read what is on this slide, but I am showing it anyway" (unless, of course, you really do not want the position for which you are applying). If, despite this counsel, you still choose to show such a slide (e.g., nucleic acid or protein sequences), use color to highlight the point you wish to make.
- Do not put too much on one page; usually one thought per page is ideal.
- Do not use too much text. Key phrases are best. This is one place where complete sentences are likely not warranted.
- Enlarge figures. Coloring lines on complicated figures sometimes helps. Add a title if the legend in the paper is too long. If you scan figures from papers, retype the relevant information in the legend so that it is large enough to be legible. There is no gain in including the legend if it cannot be read – just one more distraction. When you retype the legend, you will often have to shorten the text, which will likely improve the presentation.
- Redo tables if they contain too much data and/or are difficult to understand. Consider preparing a separate table by combining data from several tables. Say what the data imply.
- Use color to emphasize. Be aware of color compatibilities. Colors can spruce up a presentation, but many color schemes commonly used are a distraction rather than an aid. Be sure to check the compatibility of your colors before you make your presentation. Appearance on a computer screen is not a sufficiently reliable method. If it looks bad on a computer screen, it will look bad on a projection screen. If it looks good on a computer screen, try it on a projection screen and view it from the back of the room before adopting that scheme. Just because something can be done does not mean it should be done. Surprisingly, red is usually not vivid enough to show up well under projection; avoid red.

- Explain any term or technique that might not be understandable to a fair portion of a general molecular biosciences audience. This is especially important for acronyms; I suspect that DNA, RNA and ATP may be the only acronyms needing no expansion. Explanations need not necessarily be detailed; e.g., just saying what the letters in an acronym stand for often is sufficient information. Recall how much supplemental information you needed at the last seminar you attended on a subject you were not acquainted with. The balance between providing too much trivial information and talking over the head of many in the audience is difficult to define; this is one of the major tasks confronting a seminar speaker.
 - Do not waste time during the seminar reciting word-by-word what is shown on slides; assume the listeners are literate. You should show only an outline of points on the slides and use your vocal talents to fill in with additional information. Make the points on slides pithy as well as informative. This is not always easy, but if you really understand the material, you should be able to succeed. Besides, using legible fonts limits what you can fit on any one slide. It is realized that you might well need to read from slides as an aid during your first seminar, but wean yourself away from this crutch.
 - Use the laser pointer sparingly. Headaches are common place when trying to follow a dot that is constantly zigzagging all over the screen. This becomes especially crucial if you are tense; the craziness of laser-light patterns is directly proportional to nervousness. Do not so clearly advertise the fact that you would rather be somewhere else at that moment.
- B. Practice, practice, practice. Practice your talk as many times as you can, alone and before colleagues and family. If you are giving your first seminar, start about two weeks prior to your scheduled presentation. Become acquainted with difficult pronunciations. If you are in a group, try to give it at a group meeting or ask your fellow students to listen to your talk. Try to practice at least once in the room where you will give your seminar (in front of your fellow students, if possible) to familiarize yourself with the projection equipment, lights and acoustics. It is not easy to get into many of the lecture halls; the most accessible time is usually in the evenings. Practice will also help you keep within the allotted time.
- Be prepared for the unexpected. If something goes wrong, don't panic (at least openly). Stay calm. And for heaven's sake, don't mumble statements about how unfair life has been to you by throwing you this curve. Remember that the audience is not interested in your problems, but in how you will get back on track so that the seminar can continue and they can get home to dinner.
- C. Cultivate an effective stage presence. Neither nervousness nor shyness is an excuse for a poor style at the podium. Whenever possible, face the audience -- the entire audience. It is a natural inclination to neglect one side of the audience or the other; avoid that natural tendency like the plague. You never know who is sitting in the ignored section, getting upset that you are not paying attention to them. If you can't stand all those eyes focused on you, look over the heads (and not down at the feet). Face the screen sparingly, likely about one-quarter of the time you would like to do it. The screen does not evaluate your performance or offer you a job.
- D. Understand the topic well enough to be able to handle questions from the audience. When a question is asked, always (without exception) repeat the question. This allows not only people

in the back of the hall to hear what has been asked, but it also allows you to rephrase the question so that you can set up your spiffy answer.

7. Nitty Gritty

If you lose your voice to the flu and must use amplification, you will have to locate the microphone for the lecture hall and determine how it works long before you give your seminar.

For a PowerPoint presentation, you must do the following:

- Make sure to run all PowerPoint slides in a preview session using the setup in the lecture hall. There are occasions when a complex slide (typically a picture) will not download in the lecture-hall system whereas it works perfectly well with another system.
- If you can't get the picture to project, consider the toggle switch on the computer that controls where the output is directed. This video mode toggle key (F7 on a Macintosh computer) often has a couple of overlapping rectangles on it. Some computers toggle through two outputs, some three.

An overhead projector is usually available in the lecture hall. But beware that light bulbs do burn out and are often not replaced or reported by the person on watch at the time.

Regular departmental seminars are held in BLS 402, but defense seminars often need to be scheduled for lecture halls and classrooms in other buildings. Wherever you are scheduled to present a seminar, be sure to check out the lighting, projection quality and acoustics at least a few days before your seminar. Be aware of the quirks of various rooms, such as loud background from ventilation systems, inflexible light settings such as in CUE 202 or the effects of light from windows on the brightness of the projection.

8. Despite All Admonitions

There are certain points that seem to be ignored by too many speakers. The following are the most common themes in my speaker evaluations about improving the quality of the seminar.

- Failure to describe a hypothesis. One of the early slides should cover this.
- Failure to establish the significance of the research for a general audience.
- Inadequate flow of the theme throughout the talk. Use of mini-summaries after every subset of data is often an effective method for maintaining the flow.
- Failure to explain terms, especially acronyms.
- Failure to adequately explain experimental techniques.
- Use of fonts that are too small.
- Use of fonts with serifs.
- Excessive looking away from the audience. (Whether you look away or not, they are still there.)
- Addressing only part of the audience.

- Voice trailing off to inaudibility at the end of sentences or thoughts. (I am often guilty of this myself.)
- Use of meaningless conjunctions (such as "OK", "like", "ya know", "well", "ugh").
- Exuberant use of the laser pointer.
- Use of "media" and "data" as singular nouns. They have been plural nouns since the time of Romulus and Remus.
- Failure to repeat questions from the audience in your own words.

One final note: Remember that you know more than anyone else in the room about your seminar topic. The advantage is with you.

* up-dated from the original document provided by Dr. Ronald W. Brosemer

F. PROPOSALS

1. GENERAL GUIDELINES

- a. The core of the proposal should be a series of related **critical experiments** and **relevant controls that test a central hypothesis**. Proposals should be the result of your own thoughts and efforts, but you should take advantage of the resources of knowledge and experience provided by your colleagues (other students, postdocs, and faculty). Ask several other scientists, particularly other students, to critique your proposal. **In preparing your proposal, be aware that the rules are different for first and second proposal regarding assistance from your faculty advisor.**
- b. **The research proposal should adhere to the page limits specified for First and Second Proposal, respectively.** A long proposal is not necessarily a good proposal. Substance and clarity are entirely compatible with brevity. The font must not be smaller than 11 point, and there must be no more than 15 characters per inch (cpi). Helvetica or Arial 11-point are the NIH-suggested fonts. References, in full citation format, are to be added at the end of the proposal and are not included in the page limitations. Finally, pages must be consecutively numbered.
- c. You may consult a good writing manual such as Strunk and White, The Elements of Style (concise and cheap); or Day, How to Write and Publish a Scientific Paper. O'Connor and Woodward, Writing Scientific Papers in English; Woodford, Scientific Writing for Graduate Students; and Trelease, How to Write Scientific and Technical Papers are also good.
- d. The format for the proposal should be based on current NIH guidelines as summarized below. Organize the abstract and the body of the proposal to answer these questions: a) What do you intend to do? b) Why is the work important? c) What has already been done? d) How are you going to do the work?
 - i. **Cover page for proposals** that includes title, your name, PI's laboratory, semester/year (e.g., Fall, 2015), committee members, meeting place and time
 - ii. **Abstract** (NIH title is Project Summary) with a 250 word limit (on a separate page)

State the broad, long-term objectives and specific aims, making reference to the biological significance or impact of the project. Avoid summaries or review of literature and the use of the first person. The abstract is meant to serve as a succinct and accurate description of the proposed work, detailing what is the proposed research and why it is important. This section should not include references to the literature
 - iii. **Specific Aims** (limited to one page)

First, describe the broad, long-term objectives of your research effort, their biological significance, the hypothesis to be tested, and concisely what the proposed research will accomplish. Then provide a numbered list of defined specific aims (two to four), preferably as testable hypotheses, describing each one in a phrase or a sentence. A second sentence for each aim should explain how you will experimentally test your hypothesis. This section should not include references to the literature.

Your specific aims should provide the following information: What important biological problem is addressed in the application? What is the central hypothesis? What do you intend to do (experimental design)? How will you analyze and integrate the data? If the aims are achieved, what scientific knowledge is gained?

v. **Research Strategy** (limited to six pages or 12 pages, including figures and tables, for the first proposal and the second proposal, respectively)

a) Significance

Briefly sketch the background (this section must *not* resemble a review article) for the present proposal *in the context of its significance*. Critically *evaluate existing knowledge*, and specifically identify the *important gaps* that the project is intended to fill. State concisely the importance of the research described in this application by relating the specific aims to the broad, longer-term objectives.

b) Innovation

Emphasize what are the innovative aspects of the proposal, considering concepts and methods.

The significance and innovation section should provide the following information: The major conceptual issues in your proposal should be addressed, but the length should be no more than 25% of the entire proposal. What is known in the literature? Why is the proposed research important biologically? What is novel about this research? How does this application challenge or advance the existing paradigm or develop new methodologies?

c) Approach

Arrange by aims. Suggested subheadings for each aim are Rationale, Experimental Approach, Anticipated Results, and Limitations and Alternative Approaches. Restate your hypothesis for each aim. Describe the research design and the procedures to be used to accomplish each specific aim. This means discussing primarily the logic of experimental approaches, data analysis, and interpretation of anticipated results. Incorporate a description of preliminary results pertinent to the proposal that establish the validity of the hypotheses and the feasibility of the proposed approaches. You should discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims. Provide a tentative sequence or timetable for the investigation. If feasible, include a visual model of your aim.

This section and the subsections within it should not resemble the "Materials and Methods" section of a paper; however, it may be appropriate to discuss technical details if these impact the flow of the experiments. Each specific aim should be considered in an individual section, describing the logical progression of experiments and *considering the possible outcomes*. It is generally a good strategy to avoid having your entire project (or even one specific aim) depend on the favorable outcome of a single experiment or another specific aim.

The Approach section of the Research Strategy should provide the following information:

What is the rationale for each aim? The rationale should identify the question you are trying to answer, why it is an important issue to address in the context of the central hypothesis and why your chosen experimental design is well-suited to answering this question. What is the experimental approach and the design of the experiments (not detailed methods)? What are the key controls that you will perform? How will you analyze and integrate the data to test the central hypothesis? A useful way to approach this question is to outline what results will support the stated hypothesis and what would different results mean—how would they alter the working hypothesis? What are the potential limitations of your proposed approach? What are the alternative approaches? How will these approaches circumvent the weaknesses/limitations of your proposed approach?

2. PROPOSAL I

- a. **The First Proposal should be on a research project in the thesis/dissertation laboratory that the student has begun or plans to pursue.** Even though the project is likely to be at an early stage and thus experimental strategies might later evolve, the student should demonstrate an understanding of the relevant literature, develop testable hypotheses, differentiate between what is known and what needs to be done, and propose experiments that are conceptually well defined. Both thesis M.S. and Ph.D. students must successfully write and defend a first proposal.
- b. This proposal should be modeled after an NIH National Research Service Award (NRSA) individual fellowship proposal or NIH R03 proposal.
 - Recommended fonts and size are Arial and Helvetica at 11 point or larger.
 - Pages one to three are for the title page (use MB Graduate Program first proposal cover page), 250 word abstract, and specific aims page
 - Research strategy cannot exceed six pages; this page limit includes figures and tables
 - References are not included in the page limit
 - Number pages consecutively
- c. The scope of the project should reflect the work that one full-time researcher could complete in two years. Like an NRSA or R03, there is the expectation of minimal preliminary results and that the development of the proposal should be collaboration with the mentor. Ideally, well-written First Proposals should serve as the basis for applications for external support for pre-doctoral fellowships.
- d. The First Proposal can and should involve extensive interactions between you, your laboratory group members (including your advisor), and your thesis committee members. Since the First Proposal must be in the area of your advisor's research, and is likely to be a project you anticipate actually pursuing, it is quite likely that at least some aspects will have been described in a genuine grant proposal written by your advisor. It is fine to use such descriptions as a starting point, but your proposal should reflect your ideas and be written in your own words. The expansion and development of these ideas into an independent proposal should be the result of your own efforts. **It is crucial that you are familiar with the literature in your field in preparation for designing your proposal and for explaining it to others.** The criteria for success will be whether your committee feels that you have a firm understanding of the relevant literature, of issues concerning the experimental design and of the resources available to you.
- e. It is anticipated that development of this proposal will be an ongoing collaborative effort between you and your advisor. Early in the formulation of ideas for the first proposal, you can and should consult with your advisor about the scope and suitability of your intended proposal topic. You should clear the overall topic and direction of your proposal with your advisor, before you start to write.
- f. After you have written a rough draft, wait a few days and then read the draft critically with the goal of making your style and composition as clear and straightforward as possible.
- g. When you have a good rough draft completed (that you have carefully proofed and revised a number of times), you should show it to your advisor to get feedback about the general suitability of content and format.

- h. A relatively complete draft of the proposal should be finished a month before the due date. We encourage discussion with other faculty and fellow students while formulating your proposal, and the use of fellow students as critical readers. Plan to make many revisions of your proposal. Be sure to show your advisor an essentially final form of your proposal for approval of context and format.
- i. You should deliver your First Proposal to your thesis committee members and to the SMB academic office in BLS 102 at due date. Please fill in information requested on the Cover Page form (PDF-fillable version is available on the CVM J drive, SMB-Graduates folder) and use it as your first page. **Once your proposal has been submitted, no further modifications will be accepted.** You must orally defend this proposal in front of your thesis committee.
- j. If your committee, including your thesis advisor, does not consist of at least one current SMB Graduate Studies Committee (GSC) member, then the SMB Associate Director will appoint a SMB GCS member to attend your first proposal defense meeting in addition to your regular committee members.
- k. In preparation for the First Proposal, you should have your Program of Study prepared on the appropriate official forms for the Master's program or Doctoral program obtained online at <http://gradschool.wsu.edu/Forms/>. You should be able to describe your program to your committee members and obtain their approval immediately after successfully passing the first proposal defense. After approval by the SMB Associate Director for the Graduate Program, students should submit their Program of Study to the Graduate School for final approval. The approval from the Graduate School can take up to eight weeks. The requirements for graduation are those in effect at the time your Program of Study is approved.

k. Recommended Timeline for Proposal Defense

May	Sign up for two credits of MBios 593 during fall/summer preregistration.
June 1	Discuss the possible projects and goals for a proposal with your thesis advisor.
July 1	Give your thesis/dissertation advisor a preliminary draft of your specific aims.
July 15	Give a preliminary draft of the full proposal to your thesis/dissertation advisor; begin contacting committee members to schedule a proposal defense meeting.
Aug 1	Give a revised draft to your thesis/dissertation advisor for further comment.
Sept 1	Final written proposal due; provide copies to thesis committee members and the SMB Academic Office; Complete the MB Graduate Program PDF fillable Cover Sheet for the first proposal and use it as your first page
Oct 31	Oral defense completed; submit Program of Study to the Graduate School.

l. Oral Defense and Evaluation

- The time, title and place of your oral defense will be advertised to all SMB faculty and associate faculty, all of whom are invited to attend. However, only the thesis committee members and graduate training faculty members officially approved by the Graduate School may vote. The proposals will be available in the SMB Academic Office, Biotechnology/Life Sciences 102.
- You will be asked to leave the room while the faculty members discuss your general academic and research performance, and make a preliminary evaluation of the written proposal's strength and weaknesses. The examination procedures will also be discussed. You will prepare a 15-20 minute presentation of the research proposal. However, you may be interrupted during this

presentation to clarify important issues; it is often easier to answer a question in the moment rather than later.

- The faculty members will ask questions pertaining to the research proposal including the general knowledge related to the field of research. However, you may also be asked about the broader knowledge related to your proposal from the core curriculum and elective coursework. You should be prepared to defend the approaches you selected to address your aims.
- You will be asked to leave the room again while the faculty members discuss your performance.
- You will be called back into the examination room and told the outcome of the evaluation of your performance and any remediation necessary for satisfactory completion of the proposal. The chair must complete the first proposal evaluation form, distribute it to the other committee members for comments and approval, and submit to Graduate Academic Coordinator in BLS 102.
- In the event that you fail the defense of the First Proposal, the thesis committee may decide to allow you to retake the oral defense and/or revise the proposal for satisfactory completion of the proposal requirements.
- If you fail without re-take opportunity, your options are to leave the program, find another thesis home, or finish with non-thesis M.S., if you have 26 graded credit hours.

3. PROPOSAL II

- a. The Second Proposal may be based on the results you have obtained on your dissertation project since your First Proposal. Alternatively, as projects can change, your Second Proposal may be based on a relatively new research project that you have initiated. **Defense of the second proposal** is part of the Washington State University preliminary examination for advancement to Ph.D. candidacy. **In preparing the Second Proposal, be aware that the rules for obtaining assistance are different from those of the first proposal.**
- b. The Second Proposal should be modeled after an NIH R01 proposal. Students should go to the appropriate URLs for detailed guidelines.

<http://grants.nih.gov/grants/funding/424/>

SF424_RR_Guide_General_VerC.pdf , Particularly Part I, Section 5)

- The page limit for the proposal is 15 single-spaced pages using an 11 point or larger font (Arial and Helvetica are the recommended fonts).
 - Use the MB Graduate Program second proposal cover page as the title page, which includes the title, your name, PI's laboratory, and semester/year (e.g., Fall, 2015), meeting time and place, names of the committee members.
 - Page two and three are 250 word abstract (project summary) and the Specific Aims page
 - Research strategy that follows is limited to 12 pages: This page limit includes figures and tables
 - References are not included in the page limit
 - Number pages consecutively
- c. For the Second Proposal, there is the expectation of significant preliminary results, and these results should form the basis of the second School seminar, given immediately before the preliminary examination. If your research project has changed, and you do not have sufficient preliminary data, then your seminar should include background data from your lab or the literature that supports your approach.
- d. The objective of the second research proposal is to provide a mechanism that allows you: 1) to conduct experiments and collect preliminary data; 2) to develop a "second generation" hypothesis and experiments, largely based on results you have obtained since completing your First Proposal; 3) to design a longer range project; and 4) to hone your skills in the art of proposal writing. Depending on your results, the Second Proposal can be an expanded version of your First Proposal or may be an entirely new research project.
- e. The goal is to see whether you can *independently* design a biologically significant and scientifically sound project by synthesizing the relevant literature and experimental approaches. Therefore, the Second Proposal should represent a scientific advance beyond the first proposal in both the design and scope. The project should reflect the amount of work that one full-time researcher could accomplish in two to three years. You are encouraged to integrate different methodological approaches or models into your proposal, going beyond those normally used in your thesis lab.
- f. *The written document of the proposal should be prepared without direct input from your advisor and committee; you cannot give your proposal to your advisor or your committee members to revise the written document.* You may use any other resources, such as other graduate students and postdocs to help you with all aspects of the proposal.

- g. As with the first proposal, it is anticipated that development of the second proposal will be an ongoing collaborative effort between you and your advisor. You can and should consult with your advisor and your thesis committee members about the scope and suitability of your intended proposal topic. You should clear the overall topic and direction of your proposal with your advisor, before you start to write.
- h. To schedule your preliminary examination, you must have an approved Program of Study on file at the Graduate School. The scheduling form needs to be filed at the graduate school at least 10 working days prior to your examination.
- i. Your target date for your final draft copy of the proposal to your committee members and a copy to the SMB Academic Office in BLS is 10 working days before your defense date. Please complete the Cover Page form and use it as your first page. PDF-fillable version is available on the CMV J drive, SMB-Graduates folder. Once your proposal has been submitted, no further modifications will be accepted. You must orally defend this proposal in front of your thesis committee.
- j. If your committee, including your thesis advisor, does not consist of at least one current SMB Graduate Studies Committee (GSC) member, then the SMB Associate Director will appoint a SMB GCS member to attend your first proposal defense meeting.
- k. You or any faculty member can request that a Graduate Mentor Fellow from the Graduate Mentor Academy be present at the preliminary examination, as an outside, objective observer. This request is made through the Graduate School, 15 working days prior to your examination.

k. Recommended Timeline

May	Sign up for at least two credits of MBios 800 during fall preregistration (usually no need to sign up specially for this).
June15	Discuss the possible projects and goals for a proposal with your thesis advisor.
July 1	Discuss with your thesis/dissertation advisor your specific aims.
Aug	Sign up for seminar date. Contact committee members to schedule proposal defense following your second seminar. It is your responsibility to verify the date and time of your preliminary examination with the Graduate Academic Coordinator in the SMB Academic Office to ensure that there are no scheduling conflicts with other SMB functions or preliminary examination. In conjunction, schedule your second seminar date.
Aug 15	A preliminary draft of the full proposal is ready for editing
After Sept1	Submit your official Preliminary Examination Form to the Graduate School at least 10 working days before the oral defense (the official scheduling form is available on the Graduate School website). Submit completed the MB Graduate Program Second Proposal PDF fillable Cover Sheet (in J Drive) as your first page, followed by the final written proposal pages to the thesis committee members and the Graduate Academic Coordinator in the SMB Academic Office at least 10 working days before the oral defense.
Nov30	Recommended date for completion of oral defense. No prelims can be held during the final exam week.

l. Oral Defense and Evaluation

- The preliminary examination consists of two parts, a public seminar on your research (also a part of MBioS 579 seminar requirement) and an oral defense of the Second Proposal. All thesis committee members must be present throughout the final seminar and the oral defense. The examination must stop if a break is necessary, and then resume after the break.
- The time, title and place of your oral defense will be advertised to all SMB faculty and associate faculty, all of whom are invited to attend. However, only the thesis committee members and graduate training faculty members officially approved by the Graduate School may vote. The proposals will be available in the SMB Academic Office, Biotechnology/Life Sciences 102.
- You will be asked to leave the room while the faculty members discuss your general academic and research performance, and make a preliminary evaluation of the written proposal's strength and weaknesses. The examination procedures will also be discussed.
- You will prepare a 15-20 minute presentation of the research proposal. However, you may be interrupted during this presentation to clarify important issues; it is often easier to answer a question in the moment rather than later.
- The faculty members will ask questions pertaining to the research proposal including the general knowledge related to the field of research. However, you may also be asked about the broader knowledge related to your proposal from the core and elective curriculum. You should be prepared to defend the approaches you selected to address your aims. Especially for the Second Proposal, this is an examination of your knowledge and command of the topic area.
- The criteria for success will be whether your committee feels that you have a firm understanding of the relevant literature and command of the topic area, and that you can defend the approaches you have selected to test your hypotheses.
- You will be asked to leave the room again while the faculty members discuss your performance. ***For Second Proposal defenses***, the faculty members will vote Satisfactory/Fail for the preliminary examination on official ballots from the Graduate School. The number of votes required for a pass for either proposal defense is listed in the table below.

# of Examiners Qualified to Vote	# of Examiners Voting to Pass
3	3
4	3
5	4
6	5
7	6
8	6

- You will be called back into the examination room and told the outcome of the evaluation of your performance and any remediation necessary for satisfactory completion of the proposal. The chair must complete the MB Graduate Program second proposal evaluation form, distribute it to the other committee members for comments and approval, and submit to Graduate Academic Coordinator in BLS 102.
- In the event that you fail the defense of the preliminary examination and Second Proposal, the Graduate School requires that student will be re-examined for a second and final attempt, unless

a Graduate Mentor Fellow was present at the first defense. If it is recommended that the student be allowed to retake the examination, the Graduate School requires that the second examination be scheduled at least three months after the first examination. When scheduling for a second exam, the scheduling form must be submitted at least 15 working days in advance of the exam. In addition, the Graduate School will appoint a Graduate Mentor Fellow to be present at the re-take of the preliminary examination. A student who has failed two preliminary examinations may not become a candidate for the doctorate and the student's enrollment in the Graduate School will be terminated.

- If you fail, your options are to leave the program or finish with non-thesis M.S., if you have 26 graded credit hours.

G. ANNUAL REVIEW OF GRADUATE STUDENTS

1. All graduate students will be evaluated annually during each spring semester by their committee and in May by SMB faculty and associate faculty in attendance at the faculty annual review meetings.
2. First year students should have identified an advisor by the time of the annual review, but may or may not have chosen a thesis committee. If the student started in the thesis lab in late March or later, the self and faculty evaluations of laboratory rotations, academic record, and teaching performance evaluation, if applicable, will be used to evaluate him or her. If the student started in the thesis lab in Jan, he or she is required to have an annual research meeting with his or her thesis committee and fill out the Graduate Student Annual Review and Funding Effort Certification forms. The student's thesis advisor and other faculty at the faculty annual meetings may provide additional input.
3. For first year students who started in their thesis lab in Jan and students beyond the first year, students are required to complete the Graduate Student Annual Review and Funding Effort Certification forms. The review criteria will include the student's academic record, an evaluation from the research advisor and the thesis committee, an evaluation of teaching performance, if applicable, and the student's self-evaluation. The student's thesis committee and other faculty may provide additional input at the faculty annual meetings.
4. PDF fill-able Graduate Student Annual Review and Funding Effort Certification forms are available on the CVM J drive, SMB-Graduates folder. Students are responsible for providing all pertinent information requested in Sections A, B, D1, D3, and E1 (if applicable) and E3 (if applicable) of the review forms and submitting it to their committee before their annual research meeting in spring. If inquiries are not applicable, enter N/A. Section B, D1, D3, E1 (if applicable), and E3 (if applicable) require self-assessment of research progress or teaching performance.
 - a. Section B should include your research review and self-evaluation. Provide a title and a short synopsis of your research. Summarize your research goals and comment on your progress toward accomplishing goals for your research. What are your future directions and goals, if different from your current goals? What are your strengths and weaknesses, and how will you improve your weaknesses? Please list your published papers. Describe your publications to date including research papers and book chapters and manuscripts in preparation. Please list conferences or workshops (name of the meeting, dates, and location) you attended and provide the title of your presentations. Please list any honors, awards, or fellowships you received. The narrative on the accomplishments page can address a variety of topics, including high grades, demonstrating an improved command of literature, meeting seminar and proposal requirements, mastering new techniques, presentations at professional meetings, submission or publication of a journal article and service-oriented activities for the School, the University, or scientific outreach services to the community. You can also briefly list any service or outreach activities that benefit SMB, WSU or the scientific community or the public.
 - b. The research advisor, in consultation with the dissertation/thesis committee, should complete section C after the annual committee meeting. Advisors may comment on the student's research progress and accomplishments for this current review period or on research potential for a first year student, understanding of the scientific literature, the student's strengths and weaknesses, areas for improvement, results of the latest committee meeting, proposal defense, seminar performance, and research benchmarks for the next review period. The student should discuss the

completed review with the research advisor and then both student and advisor should sign and date the review form, indicating that the completed review form has been discussed.

- c. WSU has been directed by the Washington State Auditor's Office to fill out Funding Effort Certification Form (Section D) for both the fall semester (D1 and D2) and the spring semester (D3 and D4). Section D1 and D3 are a self-assessment of your research/teaching performance for the fall semester and the spring semester, respectively. If a student was on an RA, the student's research advisor fills out D2 and D4. If a student was on a TA, the TA class supervisor fills out D2 and D4. The student and supervisor should discuss the research/teaching evaluation and then both should sign and date the form indicating that the evaluation has been discussed.
 - d. Section E1 and E3 are a self-assessment of your teaching performance for the fall semester and the spring semester, respectively (if applicable). Identify the course for which you were a TA, and amount of time needed per week. Briefly describe the primary duties and student evaluations of your teaching performance. After the student has completed E1 and E3, this section should be given to the faculty who supervised the student's teaching. The teaching supervisor will complete E2 and E4, and comment on the student's teaching efforts and competence. The student and supervisor should discuss the teaching evaluation and then both should sign and date the form indicating that the evaluation has been discussed.
5. Graduate students are required to submit a completed Graduate Student Annual Review forms (Sections A, B, C, D, and E (if applicable)) by Wednesday after the final exam week in spring semesters. First year students should have three or four Graduate Student Laboratory Rotation Reviews on file. Rotation reviews should have been completed within two weeks of the completion of each laboratory rotation. Completed review packages should be submitted to Academic Coordinator in BLS 102.
 6. At the annual faculty review meeting, the Associate Director for Graduate Studies and members of the Graduate Affairs Committee will present the students' annual review packages to the faculty members in attendance. Annual review information will be forwarded to the Graduate School and a copy will be retained in the student's file.
 7. After the annual review meeting, each student will receive a memo summarizing the faculty's evaluation of his/her performance and a recommendation. The faculty recommendation can be: a) **satisfactory** performance, recommending continued enrollment; b) **satisfactory performance with deficiencies**, specifying conditions to be met for continued enrollment; and c) **unsatisfactory performance**, recommendation of dismissal from the MB graduate program.
 8. In case of a recommendation of dismissal for unsatisfactory performance, the student may respond in writing to the faculty review and recommendation. The SMB Graduate Affairs Committee will consider the student's response. In the absence of sufficient mitigating factors, the SMB-GAC will submit a recommendation to the Graduate School for termination of enrollment and dismissal from the MB graduate program because of unsatisfactory progress toward degree objectives.

H. STUDENT STANDARDS, ACCOUNTABILITY AND ACADEMIC INTEGRITY

1. Student Conduct

SMB adheres to the Student Standards and Accountability Policy of Washington State University. It is your responsibility to visit the websites listed at <http://conduct.wsu.edu/> concerning WSU policies on student standards and accountability, read the pertinent documents, and follow the rules and policies of WSU.

2. Academic Integrity

SMB supports the Academic Integrity Policy of the Washington State University. It is your responsibility to visit the websites listed below, concerning WSU's policy on academic integrity and plagiarism tutorials, read the pertinent documents, and follow the rules and policies of the University. <http://conduct.wsu.edu/file-complaint/report-academic-integrity-violation/>

WSU policy (WAC 504-26-010) states, "Academic dishonesty, such as cheating, plagiarism, fabrication, and fraud, is prohibited." Plagiarism is defined as the unauthorized use of the language or thoughts of another person, and the representation of them as one's own. (Random House Webster's College Dictionary, 1991)

It is the student's responsibility to learn proper citation conventions for proposals and journal articles. All students must review the appropriate WSU documents, attend an SMB workshop on student conduct, academic integrity, and plagiarism and sign an affidavit (contract) acknowledging his/her understanding these documents. A copy of the affidavit is on the CVM J drive, SMB-Graduates folder.

3. SMB Standard Operating Procedure for a Violation

A letter stating the nature of the academic violation, along with all appropriate documentation, will be brought to the attention of SMB Associate Director for Graduate Studies. The SMB Associate Director for Graduate Studies and members of the SMB Graduate Affairs Committee (GAC) will serve as third-party reviewers of the case, and a simple majority vote (more than 50%) will determine the outcome. Only third party members are allowed to vote on the outcome and no student peer review will be involved. The school will keep a record of the academic violation in a separate file with all recorded cases in SMB. The recommended outcomes for violations of the SMB or WSU Academic Integrity Policies include:

- The outcome can be an "F" for the assignment/exam or for the entire course, as well as a recommendation to the faculty for the termination of the student and/or a report to the Graduate School for a review by the WSU committee handling academic integrity violations.
- If either the First or Second Proposal exams are involved, the oral defense must be discontinued and a "U" grade may be assigned to the 700 or 800 credits. After review by the SMB-GAC, if it is deemed appropriate, the student may take the oral defense at a later date.
- Students found responsible for academic integrity violations in their research or special problems/directed research may receive a "U" grade for unsatisfactory progress for that term. Repeat and/or serious offences may result in the referral to the conduct board and expulsion from WSU. In addition, academic integrity violation may result in the loss of teaching and/or research assistantships.

- When the student is informed of SMB-GAC decision, he/she will also be told about the SMB Ombudsman and the WSU appeals process, as noted in the WSU websites cited above.

I. ACADEMIC REGULATIONS, PROCEDURES AND RESPONSIBILITIES

1. DEFINITION OF GOOD STANDING FOR MB GRADUATE STUDENTS

- a. For satisfactory academic performance, a graduate student must have a cumulative GPA equal to or greater than 3.0.
- b. SMB adds the more stringent requirement that the GPA calculated from grades in the SMB core and elective courses must be 3.0 or higher for satisfactory academic performance.
- c. Any student, who fails to maintain a GPA of 3.0 or higher in SMB core courses after two semesters, is not eligible for a teaching or research assistantship.
- d. Students must be accepted into the laboratory of a faculty trainer for the MB graduate students to do their thesis work no later than the end of the second semester of their first year to maintain good standing in the program. Failure to find a lab in which to perform research may result in loss of financial support and termination from the MB graduate program.
- e. Failure to make adequate progress in your research may result in the loss of financial support and termination from the MB graduate program.

2. EARNED CREDITS, THESIS/DISSERTATION CREDIT AND GPA CALCULATION

- a. If a student earns a grade of “C-“ or below in a course listed in his/her Program of Study, he/she must repeat the course for graded credit, not as S/F credit.
- b. All grades, except for the first grade in a repeated course, are averaged to calculate the student’s cumulative GPA.
- c. It is a requirement of the Graduate School that students may not carry a grade of “I” (incomplete) longer than one semester or summer session while on a teaching or research assistantship. After one year, the grade of “I” will be converted to an “F” grade on your transcript and your GPA will be adjusted appropriately.
- d. A student may petition to the Graduate School to withdraw from a course if the Registrar’s deadline has passed by filling out the Graduate Student Petition form with the approval of the instructor and the Associate Director for Graduate Studies.
- e. 700/702 and 800 credits. Credits are variable and grading is satisfactory/unsatisfactory (S/U). Credit is awarded for a grade of “S”; no credit is awarded for a grade of “U.” The S/U grades do not carry and quality points and are not calculated in the grade point average (GPA). Students found responsible for academic integrity violations in their research or special problems/directed research may receive a “U” grade for unsatisfactory progress for that term. Repeat and/or serious offences may result in the referral to the conduct board and expulsion from WSU. In addition, academic integrity violation may result in the loss of teaching and/or research assistantships. This may also be considered by the Office of Financial Aid as not making “Satisfactory Academic Progress” (SAP) and may hinder any additional Financial Aid disbursements.

3. CONTINUOUS ENROLLMENT POLICY AND TRANSFER OF GRADUATE CREDITS

- a. SMB will follow the Continuous Enrollment Policy of the Graduate School. All full and part-time degree-seeking graduate students must maintain continuous enrollment in the Graduate School, registering for each semester, excluding summer sessions (unless you are on an assistantship), from the time of first enrollment until all requirements for the degree are completed. Exceptions are made for periods during which the student is on official graduate leave or emergency medical or family leave.
- b. SMB will follow the policy of the Graduate School regarding transfer of graduate credits.
- c. If credits have been earned after the completion of a bachelor's degree from an accredited graduate school (with a grade of B or higher) and are considered appropriate to the student's program of study, the credits may be transferred and applied toward a WSU graduate degree. Credits for research and thesis problems, workshops, seminars, laboratory instruction and correspondence courses are not approved for transfer as graduate credits. SMB does not allow transfer courses to substitute for the core courses except under extraordinary circumstances.
- d. Graduate students with a bachelor's degree from WSU can apply up to 6 graduate credit hours (500 level with a grade of B or higher) toward a graduate degree, as long as the courses were not used to fulfill their bachelor's degree requirements. Approval from the Graduate School to use the credit hours towards a graduate degree must be obtained when the student registers for the course, not afterward. Students in good standing in the STARS (Students Targeted toward Advanced Research Studies) program are subject to different, program-specific criteria for setting aside credits toward a Ph.D.
- e. For a master's degree, the number of credit hours that can be transferred is limited to half of the total, required graded course credits.
- f. Transfer of graduate credit is requested formally by listing the courses on the student's Program of Study. However, preliminary determination of acceptable credits for transfer can be made earlier by request to the Graduate School, through the Associate Director for Graduate Studies.

4. ACADEMIC REINSTATEMENT, TERMINATION, RE-ENROLLMENT

- a. SMB will follow the reinstatement and termination policies of the Graduate School.
- b. During the first semester, a graduate student with a cumulative GPA between 2.75 and 3.0 after one semester of coursework will be reinstated automatically. After a student's first term, reinstatement is not automatic.
- c. A graduate student with a cumulative GPA below 2.75 after one semester of coursework will receive a letter from the Graduate School that he/she will be terminated. The SMB Associate Director for Graduate Studies, after consultation with the SMB Graduate Affairs Committee, may write a letter to the Dean of the Graduate School requesting reinstatement of the student. The student must provide a reasonable plan for improvement of his/her academic performance.
- d. If the student's cumulative GPA increases to above 2.75, but below 3.0, after two semesters of instruction, the SMB Associate Director for Graduate Studies, after consultation with the SMB Graduate Affairs Committee, may write a letter to the Dean of the Graduate School requesting reinstatement of the student. If approved by the Dean of the Graduate School, the student will have one more semester to increase his/her GPA to 3.0. If the student's GPA is still less than 3.0

after three semesters of coursework, the student will be terminated for unsatisfactory academic performance.

- e. If the student's GPA is below 2.75 after two semesters of instruction, the student is not eligible for reinstatement and will be terminated for unsatisfactory academic performance.
- f. If you fail first or second proposal and you have no re-take opportunity, your options are to leave the program or finish with non-thesis M.S., if you have 26 graded credit hours.
- g. A graduate student who was dismissed for unsatisfactory academic performance may request re-enrollment if improved academic performance can be demonstrated. The SMB Associate Director for Graduate Studies with either the SMB Graduate Recruiting Committee or the SMB Graduate Affairs Committee will be evaluated the request. If the request is deemed acceptable, the Associate Director will write a letter to the Graduate School requesting re-enrollment.

5. EXCEPTIONS TO POLICY PROCEDURE

- a. Requests for an exception to policy for a student should be submitted in writing to the SMB Associate Director for Graduate Studies by the thesis advisor with documented approval of the thesis committee members, when applicable.
- b. The written requests for exception will be forwarded to the SMB Graduate Affairs Committee for discussion. The committee must approve any request for an exception to policy, especially for a student without a thesis committee.
- c. After appropriate approvals from the thesis committee and the SMB Graduate Affairs Committee, the SMB Associate Director for Graduate Studies will write a memo to the Dean of the Graduate School requesting an exception to policy. As per Graduate School policy, the Dean may then act upon the request or refer it to the WSU Graduate Studies Committee for a decision.

6. LEAVE AND VACATION TIME

- a. RA and TA assistantship appointments run continuously from August 16th to May 15th and also during the summer session. If you are on an assistantship, a minimum expectation is to follow the staff workday calendar including periods when the University (classes) is not in session with the exception of the legal holidays designated by the Board of Regents.
- b. Graduate students on appointment do not earn annual leave or sick leave. Any leave or vacation time should be arranged with your supervisors (research and/or teaching) in advance. Your research plans should dictate your time at work, rather than your vacation schedule dictate your research plans. Furthermore, it is imperative that you notify your supervisor and/or other lab personnel if you will miss work for illness.

SMB adheres to the Graduate School policy described in the Policies and Procedures, Chapter 5: <http://gradschool.wsu.edu/chapter-five-a6-7/>

The Short-Term Parental Leave Form is available at:

<http://gradschool.wsu.edu/documents/2014/12/short-term-parental-leave.pdf>

J. TRAVEL AWARDS FOR GRADUATE STUDENTS

SMB encourages students to present their research at scientific meetings or a similar type of gathering of investigators from the scientific community (e.g., travel to visit collaborator to develop new skills) and provides travel grants to help defray the costs of doing so.

- Students who have passed their Preliminary Exam are eligible to receive a one-time Dr. Bruce Gibbins Graduate Travel Fellowship. The program will award up to \$1000 to defray the cost of travel, registration and/or accommodations at a scientific meeting or a workshop. The student's research advisor must approve the attendance at the meeting or workshop. The student must present a poster or talk at a meeting or actively participate in a workshop or collaboration.
- The SMB Travel Application form is provided on the CVM J strive, SMB Graduates folder.
- Students are expected to pursue the most economical transportation rates and lodging options to save on costs. It is recommended that you make reservations early for lower rates.
- Students should pursue additional potential sources to support travel and meeting registration costs including awards from the Graduate Professional and Student Association (<http://www.gpsa.wsu.edu/>) and the society sponsoring the meeting.

K. SCHOOL OF MOLECULAR BIOSCIENCES OMBUDSMAN

You should contact the Ombudsman if you have a problem or conflict related to the School of Molecular Biosciences or WSU that is beyond your ability to resolve with resources such as your thesis advisor or the Associate Director for Graduate Studies. The Ombudsman will serve as a neutral and confidential listener, and will help to mediate a resolution to problems or provide information about further steps that can be taken. The Ombudsman is also a confidential resource for information concerning University and School rules, policies, and procedures.

The SMB Ombudsman is Dr. Terry Hassold, Biotechnology/Life Sciences 331, terryhassold@wsu.edu, (509) 335-4953.

L. NON-THESIS MASTER'S DEGREE

The policy of the School of Molecular Biosciences is to not offer non-thesis master's degree in Molecular Biosciences. However, in certain situations, it may be deemed appropriate for students, previously admitted to pursue a thesis degree program, to terminate their studies with a non-thesis master's degree. This document details the requirements set forth by SMB and the Graduate School for the awarding of a terminal non-thesis master's degree.

1. Students must meet the Graduate School course requirements for a non-thesis Master's degree.

- 30 hours minimum of total credit
- 26 hours minimum of graded course work
- 17 hours minimum of graded course work at the 500-level
- 4 hours minimum of credit in MBioS 702; two credits must be taken in the semester of project completion/graduation
- 9 hours maximum of non-graduate 300 and 400 level graded course work credit

2. Academic Standard

- To be awarded the non-thesis Master's degree, the Graduate School requires that a student must have a 3.0 cumulative GPA and a 3.0 program GPA. Other Graduate School requirements apply.
- To that, the School of Molecular Biosciences adds the more stringent requirement that students must have a 3.0 GPA or better in the SMB core and elective courses.
- A graduate student who fails to establish and maintain the academic standard as indicated above and in Section I. Academic Regulations, Procedures and Responsibilities will be terminated from the program.

3. Selection of Non-thesis Committee

- Students should choose a primary advisor who is an SMB faculty or an associate faculty member, and at least two additional faculty members to serve on the non-thesis committee. Two members of the committee must be SMB core faculty members.

4. Submission and Approval of the Program of Study

- The committee should help students develop and then approve a Program of Study as outlined by the Graduate School. The Program of Study must be approved by the Associate Director for Graduate Studies and the Graduate School by the beginning of the semester before the semester of graduation and prior to the semester of registration in MBioS 702.

5. MBioS 702 Requirement

- Students must enroll in MBioS 702 "Master's Special Problems," for a total of four credits, and write a faculty-mentored research proposal, which can be based on preliminary experimental data and/or published literature.

- The objective of the paper is to use library resources to develop a proposal that could be completed in approximately two years by one full-time researcher. This mechanism should: 1) challenge the student to think creatively; 2) encourage the student to interpret and integrate concepts and methodologies in the field of biochemistry, biophysics, cell biology, genetics, or microbiology; and 3) demonstrate the ability to use analytical thought and the scientific method in problem solving.
- The research proposal should not be more than 10 single-spaced pages, including figures and tables. The font should be 11 point or larger; Helvetica or Arial 11-point is the NIH-suggested font. References are not included in the page limitations.
- The format of the proposal should conform to the MB Graduate Program Guidelines for Proposals in Section F, specifically for Proposal I.
- A copy of the final written research proposal and the completed cover page form (J drive) are due to the members of the M.S. committee and to the SMB Academic Office, in Biotechnology/Life Sciences 102, ten working days before the final examination. The cover page is in the CVM J drive, SMB-Graduates folder
- A successful first proposal defense constitutes the SMB fulfillment of the MBioS 702 requirement. Students must still enroll in MBioS 702 “Master’s Special Problems,” for a total of four credits, with a minimum of two credits being completed the term in which you are defending, to complete the Graduate School requirements.

6. Final Master's Examination

- The student must be registered for a minimum of two credits in MBioS 702 for the semester during which the final examination is to be taken. At least 10 working days before the final examination is scheduled, the completed Non-Thesis Final Oral Scheduling Form (with signatures from the M.S. committee and the Associate Director for Graduate Studies) must be submitted to the Graduate School. The final examination will be conducted by the M.S. committee, and attendance is open to all SMB faculty and associate faculty. The examination will normally consist of a short presentation, 20-25 minutes, by the student, followed by a question and answer period directed by the attending faculty. However, only graduate training faculty can vote. The examination will be approximately an hour in duration and is limited to one and one-half hours.
- In the event that the student fails the final examination, a second and final attempt may be scheduled after a lapse of at least three months upon approval of the M.S. Committee.

<u># of examiners qualified to vote</u>	<u>minimum # of examiners voting to pass</u>
3	2
4	3
5	4
6	4
7	5

M. STUDENT LEARNING OUTCOMES OF MOLECULAR BIOSCIENCES GRADUATE PROGRAM

Objectives for Student Learning Outcomes:

1. Trainees will gain *research expertise* that is interdisciplinary, spanning the areas of cellular, molecular and structural biology, and receive focused training in biochemistry, cell biology, genetics or microbiology. This outcome will be demonstrated by their ability to:
 - a. Develop the skills to critically read and evaluate molecular biosciences literature and place new findings in the context of the previous and current research in their general discipline and specific field of expertise.
 - b. Develop testable hypotheses based on an in-depth understanding of previous and current research, and design experimental approaches to successfully test the hypothesis. Evaluate experimental results critically, including quantitative analyses, and formulate a defensible conclusion. Demonstrate technical competency in appropriate methodologies from the disciplines of biochemistry, genetics and microbiology.
2. Trainees will have opportunities to master various *professional skills*, particularly in the areas of communication, mentoring and leadership. Success in this outcome will be demonstrated by students' ability to:
 - a. Communicate their research results and its importance to experts in their field as well as general lay audiences, effectively in both written and oral form.
 - b. Understand and follow norms of scientific ethics, including concepts of publication ethics and responsible conduct in research.
 - c. Exhibit proficiency in mentoring and teaching, including development of leadership skills.

Assessment Plan for Student Outcomes: *Data to be collected [source and/or evaluator]*

Objective 1: Research and Technical Expertise

1a. Master the Breadth and Depth of Molecular Biosciences Literature and Knowledge

- Grades in the three required core MBioS courses (Molecular Biology, Deconstruction of Research, and Experimental Design and Methods) and the SMB elective courses {faculty teaching the courses; transcripts}. Biochemistry is also a core course for students requiring Biochemistry for their research. Ph.D. students are required to complete a total of 15 graded credit hours; but strongly encouraged to complete 21 graded credit hours.
- Performance in laboratory rotations {written assessment by student and PI}
- Outcome for First Proposal on student's thesis/dissertation research (modeled after an NRSA or an R03) and its oral defense {First proposal outcome grade (S/F) and report form from committee members and other faculty in attendance}
- Outcome for the Preliminary Examination, i.e. the Second Proposal document on the evolution of their dissertation research (modeled after an R01) and its oral defense {Pass vote and second proposal outcome report form from committee members and other faculty in attendance}
- Quality of the required departmental seminars, three for Ph.D. students, and one for M.S. students {oral evaluations by a designated set of faculty}

- Presentations at annual thesis committee meetings {written annual review assessment prepared by thesis committee members after each meeting and an individualized letter from the Associate Director}
- Quality of thesis or dissertation and final defense seminar {thesis committee members and other faculty in attendance}

1b. Develop Technical Competency, Test Hypotheses, Evaluate Results and Formulate Conclusions.

- Performance in laboratory rotations {written assessment by student and PI}
- Outcome for First Proposal on student's thesis/dissertation research (modeled after an NRSA or an R03) and its oral defense {First proposal outcome grade (S/F) and report form from committee members and other faculty in attendance}
- Outcome for the Preliminary Examination, i.e. the Second Proposal document on the evolution of their dissertation research (modeled after an R01) and its oral defense {Pass vote and second proposal outcome report form from committee members and other faculty in attendance}
- Quality of the required departmental seminars, three for Ph.D. students, and one for M.S. students {oral evaluations by a designated set of faculty that stay after the seminar}
- Presentations at annual thesis committee meetings {written annual review assessment prepared by thesis committee members after each meeting}
- Presentations at regional and national scientific meetings and participation in workshops {GAC evaluation of travel awards applications and written annual review by faculty mentor and thesis committee members}
- Quality and number of publications resulting from thesis or dissertation research {Annual review by faculty mentor and thesis committee members}
- Quality of thesis or dissertation and final defense seminar {thesis committee members and other faculty in attendance}

Objective 2: Professional Development

2a. Written and Oral Communication Skills

- Data are collected as described for Objectives 1b.
- Performance as a teaching assistant {student and instructor evaluations in the Annual Review; Appendix C4} and participation in TA Training and How to Teach Writing {tracked by Graduate Academic Coordinator}
- Participation in the SMB and iPBS professional development workshops on communication skills. Annual topics include: Manuscript Writing, Proposal Writing, Laboratory Notebook, How to Teach Writing, Summer Writing Workshop {monitored by Graduate Academic Coordinator}

2b. Responsible Conduct and Science Ethics and Public Policy

- Participation in workshops on Academic Regulations and Integrity, Responsible Conduct in Research, Biosafety & Lab Safety will be conducted by SMB or iPBS {monitored by Graduate Academic Coordinator}

- Enrollment in Philosophy 530 (Bioethics) is not required, but it is highly recommended that students enroll in this course. It is a requirement for students with Protein Biotechnology training grant.

2c. Mentoring, Teaching and Leadership Skills

- Performance as a teaching assistant {student and instructor evaluations in the annual review} and participation in iPBS professional development workshops in the category of Academics and appropriate workshop in the Graduate School Professional Development Initiatives {tracked by Graduate Academic Coordinator}
- Participation in the SMB and iPBS professional development workshops, and appropriate workshop in the Graduate School Professional Development Initiative. The iPBS categories are Career and Leadership & Professionalism {tracked by Graduate Academic Coordinator; Appendix D1 and D2}
- Performance as a mentor of undergraduate researchers, when possible {written in student annual review}
- Performance in service and outreach {written in student annual review}

Collection and Review of Outcomes Assessment Data

The Graduate Academic Coordinator collects Outcomes Assessment Data (course grades, proposal evaluations, annual thesis/dissertation committee evaluation, and teaching performance evaluation) for Objectives 1 and 2. The faculty mentor's annual evaluation is included as part of the Annual Review process. Data are evaluated during the year as needed by the Associate Director for Graduate Studies and the Graduate Affairs Committee. All outcome assessment data are evaluated for each current graduate student every year at the May Annual Review meetings attended by SMB core faculty and Associate Faculty.

SCHOOL OF MOLECULAR BIOSCIENCES FORMS

Current forms are available, in PDF-fillable or WORD format, on the CVM J drive, SMB-Graduates Folder.

First Year Advising Checklist
Student Conduct, Academic Integrity, and Other Required Workshop Contract
Laboratory Rotation Review Form
Cover Page for Research Proposal I
Report Form for Research Proposal I
Cover Page for Research Proposal II
Report Form for Research Proposal II
Annual Review and Funding Effort Certification Form
Cover Page for Non-Thesis degree
Graduate Student Travel Award Application (Dr. Bruce Gibbons Travel Fellowship)
Graduate Student Travel Authorization

GRADUATE SCHOOL FORMS

Current forms are available, in PDF-fillable or WORD format, on the WSU Graduate School web page:
<http://gradschool.wsu.edu/Forms/>

Masters Degrees

- Deadlines and Procedures
- Program for Master's Degree
- Application for Master's Degree
- Final Exam Scheduling Form (thesis and non-thesis)
- Final Thesis/Dissertation Acceptance Checklist
- Program Change
- Committee Change

Doctoral Degree

- Deadlines and Procedures
- Program for Doctoral Degree
- Preliminary Examination Scheduling Form
- Application for Doctoral Degree
- Dissertation & Thesis Guidelines
- Digital Dissertations & Thesis Submission
- Dissertation & Thesis Formatting
- Bookbinding Vendors
- Final Exam Scheduling Form
- Final Thesis/Dissertation Acceptance Checklist
- Program Change
- Committee Change