

**Integrative
Physiology &
Pharmacology
Program**

**2018-
2019**

**STUDENT
HANDBOOK**

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Graduate Program Overview

A graduate degree in Integrative Physiology and Pharmacology is advantageous for employment environments in which familiarity with multiple organ systems is important:

- academic research institutions
- the pharmaceutical industry
- biotechnology companies, start-up pharmaceutical companies
- academic teaching institutions, including undergraduate education as well as professional schools (medical, dental and veterinary, pharmacy, and allied health professions (nursing, physical and occupational therapy, physician's assistant programs)
- government regulatory agencies (e.g., EPA, FDA, CDC)
- scientific writing

The IPP program is designed to train students in a variety of modern methodologies and to prepare them to use whatever conceptual and technological approaches are most appropriate for pursuing promising new areas of research. This takes place within a collegial environment in which each investigator has multiple ongoing collaborations and a given project typically involves the complementary expertise of multiple participants.

The **average time to completion** of the IPP Ph.D. degree (over the past 10 years) is 5.1 years. Upon completion of the IPP degree, the following competencies will have been mastered:

- broad knowledge base in Physiology and Pharmacology
- multiple research techniques
- experimental design and statistical analyses
- responsible conduct of research, ethics and professionalism
- scientific communication skills (poster and oral presentations)
- scientific writing skills (abstracts, manuscripts and grant proposals)
- critical evaluation of scientific thought

The structure of the IPP program:

The IPP program trains both M.S. (Master of Science in Biomedical Science [MSBS] program) students via a Concentration in Integrative Physiology and Pharmacology, as well as Ph.D. and M.D./Ph.D. students. The IPP program is governed by an Executive Committee comprised of the chairs of the Admissions and Recruitment Committee, the Curriculum Committee and the Student Progress Committee, plus the Program Director and two at-large faculty members.

- The Program Director (elected by the Executive Committee) serves as the program administrator, the Chair of the IPP Executive Committee and the advisor of Ph.D. matriculants through the first year and is responsible for all day-to-day management and long-term program planning for the IPP program.
- The Admissions Committee evaluates applications, co-ordinates interviews, accepts students into the Ph.D. program, and advises the MSBS program on the suitability of MS applicants for the IPP Concentration.
- The Curriculum Committee determines the Core course requirements, designs and approves course modifications to be presented to the Graduate Council, assigns course directors, develops and administers the IPP Final Examination and evaluates and approves individual student requests for curriculum modifications.
- The Student Progress Committee monitors students throughout their entire program, evaluating their progress in coursework and laboratory performance. This committee reviews students' progress toward completing required Milestones (see below), including ensuring that doctoral candidates are making adequate progress toward completion of their dissertation research.

- The faculty of the IPP Program are members of the Graduate Faculty, drawn from basic science and clinical departments at WFU and the Wake Forest School of Medicine, approved by the WFU Graduate Council and subsequently approved by the Executive Committee as members of the IPP program for their roles in teaching, internship coordination and student research advising.

Administrative Policies & Procedures of the IPP Program

1. IPP Program Director

The IPP Director has three primary areas of responsibility:

- ...to the students enrolled in the IPP Program—to enhance and integrate their educational experience, research training, professional development and career opportunities.
- ... to the IPP faculty—to balance their teaching responsibilities, facilitate students' entry into their laboratories and provide an innovative, integrative approach to graduate education, research, and career development.
- ...to all Graduate School programs—to coordinate IPP activities to serve the Graduate School's overall mission of attracting the best prepared, most highly-motivated students and educating them to be tomorrow's leaders in science, education and service.

IPP Director Selection: The Director will be elected by the Executive Committee, in consultation with the appropriate Department Chair, from nominations received from the IPP faculty members. Nominees will be members of the graduate faculty at the rank of Associate Professor or above. The name of the selected Director will be sent to the Graduate School Dean who will appoint the Director following evaluation of appropriate credentials and consultation with the relevant Department Chair. Salary support commensurate with the Director's responsibilities will be provided by the WFU Graduate School of Arts and Sciences.

Graduate Student Recruitment and Admissions: The Director will work with the Admissions Committee to develop strategies that will attract a diverse group of applicants who are strongly committed to developing a successful career. The Director and Admissions Committee will develop admissions criteria that emphasize research experience, academic background and maturity while also considering quantitative elements (GPA, GRE) as well as the match between the applicant's research interests and the strengths of the faculty within the IPP program.

Advising and Mentoring Graduate Students: The Director will take the lead in developing a comprehensive evaluation process and work with the Student Progress Committee (SPC) in refining this process as well as applying it so as to measure and track the progress of each of our students, from recruiting through their graduate training and career paths. These metrics will enable refinement of the IPP program and strengthen the development of extramural training grant applications.

The Director will serve as the 1st year academic advisor for each of the students entering the IPP program each fall. The Director will meet early on with each new student to guide his or her selection of research rotations, and will track progress in courses. The Director and the SPC will have a special responsibility to identify students needing assistance in adjusting to the pace and challenges of the WFU Graduate School of Arts & Sciences. In the spring term, the IPP Director will work closely with each student and research rotation mentors to match the research laboratory best suited to the student's strengths and interests.

Liaison to WFU Graduate Programs: The Director will coordinate the activities within the IPP Program as well as with the other WFU Graduate School programs, subject to the Graduate School Bylaws and approval of the Dean of the Graduate School. New programs may be proposed following the Graduate School's normal procedures and included within IPP, subject to the approval of the IPP Executive Committee and the Graduate School.

IPP Administrative Assistant: The Director will work closely with the IPP Administrative Assistant who will coordinate admissions and related tasks, and keep electronic records of each student's progress.

Curriculum Development: The Director and the Curriculum Committee will work together to define and optimize core courses and electives. In consultation with the faculty and Department Chairs, the Director and the Curriculum Committee will select course directors, define their responsibilities and ensure that they have the resources needed to develop and teach the common courses within IPP. The Director together with the Curriculum Committee will evaluate each course on a yearly basis, and recommend improvements based on student and faculty input.

2. The Admissions Committee

The Admissions Committee will consist of IPP faculty members who have experience in training Ph.D. students, plus the Director. The membership of the Admissions Committee will be proposed by the Chair(s) and the Director, and approved by the IPP Executive Committee. Ideally, the membership will be drawn from multiple disciplines or departments/research groups that contribute to the teaching within IPP. The Chair(s) will serve on the IPP Executive Committee.

The functions of the Admissions Committee include:

1. reviewing materials submitted by applicants to the IPP Ph.D, MSBS (M.S.) and M.D./Ph.D. programs. Although the priorities are generally set by the Chair of the Admissions Committee, the most important criteria for predicting success in the IPP Program are assumed to be research experience, academic background and overall maturity. The Committee may also consider GRE and/or MCAT scores, GPA, the applicant's personal statement, letters of recommendation and any other materials that are submitted. The Committee typically begins reviewing applications in November and selects individuals to travel to Wake Forest for interviews by mid-January.
2. organizing the events surrounding the recruitment/interview weekend, which is typically held in February.
3. following the interviews, deciding the order of priority for the applicants to receive offers of matriculation for the upcoming fall term, and communicating these decisions to the Director and the Graduate School, who formally makes the offers.

3. The Curriculum Committee

The Curriculum Committee will consist of IPP faculty members who have experience in teaching courses or training Ph.D. students, plus the Director. The membership of the Curriculum Committee will be proposed by the Chair(s) and the Director, and approved by the IPP Executive Committee. Typically, the membership will be drawn from multiple disciplines or departments that contribute to the teaching within IPP. The Chair(s) will serve as a member of the IPP Executive Committee.

The functions of the Curriculum Committee include:

1. Periodically evaluate the course offerings by the IPP program and submit any changes to the Graduate School. Upon approval by the Graduate Council, the Curriculum Committee will advise the Director, such that changes can be made on the IPP website.
2. Identify which courses will be taught in the fall, spring and summer semesters of each academic year. Ensure that course directors are available for each of the courses. Notify the Graduate School that these courses will be taught, and in which semester.

For each course, the Course Director will be responsible for the content of the course, the implementation of the course, assembly of the teaching faculty, preparation of the examinations or other assignments.

3. Prepare, administer and grade the IPP Final Exam.
4. Adjudicate any student request for exceptions to IPP program requirements.

4. The Student Progress Committee

The Student Progress Committee will consist of IPP training faculty members who have had experience in training Ph.D. students. The Chair will serve as a member of the IPP Executive Committee. This committee, which is expected to act with compassion but also to uphold the high standards of the IPP Program and WFU Graduate School, is an important resource for students who are having any manner of difficulty in any aspect of their graduate career.

The functions of the Student Progress Committee include:

1. Evaluate progress of first- and second-year students until they have assembled a Dissertation Committee, at which time the Dissertation Committee will assume responsibility for the student's research progress. Evaluation will involve reviewing student research rotation reports from the mentors each semester, examining transcripts of students after each semester, and meeting with individual students who receive C grades or poor research reports. A course of action will be recommended for each individual student who has not met expectations. Documentation of the advice of the Student Progress Committee will be submitted to the student's file by the Chair.
2. Serve as an advisory committee for students who are having difficulties in their academic progress at any stage of their training. Students who are in academic difficulty, have a problem in the laboratory, such as concerns with their advisor, laboratory personnel, their dissertation committee, or other situations that require advocacy, can request an unbiased evaluation of the situation by the Track Director or the Chair of the Student Progress Committee in complete confidentiality. The Student Progress Committee will hear the student's concerns and recommend a course of action for the student. Documentation of the advice of the Student Progress Committee will be submitted to the student's file by the Chair.
3. Document the progress of each student in the IPP Final Examination and the Preliminary Research Proposal required for Advancement to Candidacy. The Student Progress Committee will notify each student upon their successful completion of the Comprehensive Examination, and advise them of the time-frame for the assembly of their Dissertation Committee and writing and defense of their Preliminary Research Proposal. The Student Progress Committee will be notified by the student's Dissertation Committee upon successful completion of the Preliminary Research Proposal.

In the event of a student's unsuccessful completion of the IPP Final Examination, the Student Progress Committee will meet with the student to determine any extenuating circumstances. The Student Progress Committee will evaluate the student's situation and may advise a plan of action for the student. The plan could provide for a course of remediation, which may involve a course of study in preparation for a retake of the unsuccessful component(s) of the examination. Documentation of the advice of the Student Progress Committee will be submitted to the student's file by the Chair.

IPP Program Leadership, 2018-2019

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Jeff Martin, Ph.D.
Steve Childers, Ph.D.
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Tracy Criswell, Ph.D.
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David Caudell, D.V.M.
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Curriculum Committee

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Hossam Shaltout, Ph.D., co-Chair
Paul Czoty, Ph.D.
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Carol Shively, Ph.D.
Graca Almeida-Porta, Ph.D.
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Mark Chappell, Ph.D.

Student Progress Committee:

Jeff Martin, Ph.D., Chair
Charles Eldridge, Ph.D.
Kylie Kavanagh, D.V.M.
Brian McCool, Ph.D.
Tracy Criswell, Ph.D.
James Daunais, Ph.D.

Academic Overview – Ph.D. Program

This section presents a brief overview of the typical course of study for a Ph.D. student in the IPP Program. It should be emphasized that deviations from this specific progression are possible after review by the Curriculum Committee. Progress through the curriculum is monitored through the use of Milestones as described in the next section.

Year 1

Core courses: Analytical Skills (MCB 700); Physiological Techniques (IPP 715); Principles of Pharmacology (IPP 701); Molecular & Cellular Biosciences (MCB 701); Systems Physiology & Pharmacology (IPP 702)

Research design, professionalism and communications competencies:

- Student Seminar – IPP 703/704; each student receives feedback each year on his/her research presentation
- Journal Club – [various course numbers]; each student presents one or more research articles to a journal club of his/her choice, and attends professional research seminars in the research area of his/her choice
- Scientific Integrity – GRAD 713/714; a year-long course on responsible conduct of research administered by the Graduate School for all students
- Professional Development – GRAD 715/16; a year-long course administered by the Graduate School which introduces students to multiple career options

IPP Final Examination: At the end of Year 1, students undertake the IPP Final Examination, which challenges students to integrate knowledge gained in the core courses.

Research skills: (IPP 797/798) Ph.D. students participate in research rotations in two or three different laboratories (Fall, Spring, Summer). Each rotation is followed by an evaluation conducted with the research advisor. A written evaluation form, signed by both student and rotation advisor, is submitted to the Director and the Student Progress Committee. Research credit each semester (Satisfactory/Unsatisfactory) is based upon this written evaluation.

Research Laboratory and Advisor: At the end of Year 1, the Ph.D. student selects a research advisor from among the rotation experiences, to begin a dissertation project in year 2.

Year 2

Core courses: Quantitative Methods (IPP 741)

Electives chosen by the student in consultation with his/her advisor. These may be offered by any academic program of the medical school or Wake Forest University, subject to approval by the Curriculum Committee. Students are required to take a minimum of 4 credits of electives, but are encouraged to take additional relevant electives following discussion with their advisors.

Journal Club, Seminar (various journal club course numbers, IPP 705/706)

Individual Development Plan: In Year 2, students complete the Individual Development Plan self-evaluation assessments from the AAAS Science Careers website and to read through the accompanying informational materials. Students self-identify general career directions, and are asked to begin participating in extracurricular activities that can help them determine if this direction is right for them. These self-evaluations are discussed as a cohort with the Director and Student Progress Committee.

Research: IPP 797/798; By the end of Year 2, the student and advisor identify a dissertation project, and together have selected a Dissertation Committee whose members have expertise in diverse aspects of the project. The typical size of this committee is 5 members including the advisor and one member from outside the advisor's department who serves as Chair of the Dissertation Committee.

An initial meeting is held to apprise the Dissertation Committee of the nature of the proposed project and obtain initial advice. The student then prepares a written Dissertation Proposal in the style of an application for predoctoral extramural funding relevant to the student's research (e.g., NIH NRSA or American Heart Association grant) to be evaluated and approved by the Advisor and the Dissertation Committee. Within three weeks of approval of the written document, the student undergoes an oral defense of the proposal, during which the Dissertation Committee assesses the student's knowledge of all aspects of the proposed project. In particular, the Dissertation Committee will assess the student's understanding of the rationale, experimental design, hypotheses and alternative interpretations and contingencies. The student will also be evaluated regarding knowledge of statistical analysis of the proposed project. Following the proposal defense, the Dissertation Committee Chair advises the IPP Director and Dean of the Graduate School of the successful completion of the proposal, and, assuming all other milestones are completed, the student is Advanced to Candidacy. It is the student's responsibility to assure that the necessary form is completed and returned to the Director.

In the event that the Dissertation Committee does not recommend successful passing of the Preliminary Proposal Defense, the Student Progress Committee will meet with the student and make a recommendation regarding either remediation or alternative program planning.

Year 3 and beyond

The majority of a student's time in Year 3 and beyond is spent working toward completion of dissertation research. Students continue to participate in Journal Club and Seminar courses until the semester in which they plan to graduate. Students are encouraged to meet with their dissertation committee every 6-9 months. It is advisable to hold one of these meetings after the student's yearly seminar.

Individual Funding; Grant Submissions: Students submit their Dissertation Proposal to the appropriate funding agency.

Professional Development: Each student may engage a professional development mentor who is experientially able to assist him/her along an individual development pathway. In addition, professional development GRAD courses for credit can be taken, such as teaching course (experience at local institutions);, internship Opportunities (local industry or institutional research administration) or technology assessment (research innovation, intellectual property protection, and commercialization).

Program completion

Final Dissertation Committee Meeting: When the student has completed all the experiments described in the Specific Aims, the IPP Executive Committee strongly recommends holding a final committee meeting, the goal of which is to obtain the committee's assent that a sufficient amount of experimentation has been done. This agreement indicates that the student can shift focus to preparing manuscripts and the written dissertation. Once this step has been taken, the student becomes exempt from the seminar and journal club requirements in the semester in which the defense is anticipated.

Written Dissertation: The Dissertation is comprised of a thorough Introduction to the field, a compendium of the student's publications, submitted manuscripts, or manuscripts in preparation for submission, followed by a thorough Discussion section that analyzes the contributions of

these studies to the field. The IPP Executive Committee expects that the student will have completed (i.e., submitted) a minimum of two first-author manuscripts or publications for completion of the degree. The Dissertation Committee critically evaluates content, makes recommendations for improvement, and ultimately approves the written document. The document is also submitted to the Graduate School for approval of form and format. Per Graduate School rules, the written document must be submitted to the Graduate School and to the Dissertation Committee a minimum of four and two weeks, respectively, prior to the Dissertation Defense.

Dissertation Defense: Seven days prior to the scheduled defense, the chair of the thesis committee polls the committee members to determine whether the thesis is defensible. The results of this polling are reported to the student, the advisor and the IPP Director. After the written document has been approved by the Dissertation Committee, the student gives a public seminar highlighting the research data and its importance to the field. This is followed by a private defense with the Dissertation Committee. The Dissertation Committee makes the recommendation to the Dean of the Graduate School that the student has passed the Dissertation Defense and that all requirements toward the Ph.D. degree have been completed. In the event that the Dissertation Committee does not recommend passing, the Committee will provide guidelines to the student specifying how or whether the student can prepare a passable written document or remediate the defense.

Note: some exceptions to the above requirements are made for M.D./Ph.D. students as described on page 12.

Milestones – Ph.D. Program

<u>Course/activity</u>	<u>milestone</u>
<u>First Year, fall semester</u>	
MCB 700: Analytical Skills	final grade of C or better
MCB 701: Molecular & Cellular Biosciences	final grade of C or better
IPP 701: Principles of Pharmacology	final grade of B or better
IPP 703: Student Seminar	final grade of B or better
Journal Club	final grade of B or better
IPP 715: Physiological Techniques	satisfactory
IPP 797: Research rotation	satisfactory evaluation
GRAD 713: Found. of Scientific Integrity & Professionalism	satisfactory
GRAD 715: Career Planning in Biomedical Sciences	final grade of C or better
<u>First Year, spring semester</u>	
IPP 702: Systems Physiology & Pharmacology	final grade of B or better
IPP 704: Student Seminar	final grade of B or better
Journal Club	final grade of B or better
IPP 798: Research rotation	satisfactory evaluation
GRAD 714: Scientific Integrity & Professionalism	satisfactory
GRAD 716: Seminars in Professional Development	final grade of C or better
IPP Final Exam	pass
<u>First Year, summer</u>	
IPP 797: Research (rotation)	Satisfactory evaluation
<u>Second Year, fall semester</u>	
Elective course*	final grade of C or better
IPP 703: Student Seminar	final grade of B or better
Journal Club	final grade of B or better
IPP 741: Quantitative Methods	final grade of C or better
IPP 797: Research	Satisfactory evaluation
<u>Second Year, spring semester</u>	
Elective course*	final grade of C or better
IPP 704: Student Seminar	final grade of B or better
Journal Club	final grade of B or better
IPP 798: Research	Satisfactory evaluation
<u>Second Year, summer</u>	
Research	Satisfactory evaluation
GPA	overall GPA > 2.5
Proposal Defense	pass
IDP	approved

*Ph.D. students are required to take ≥ 4 credits of elective courses, which can be completed at any time

Completion of all milestones is required for advancement to Candidacy

Milestones – M.D./Ph.D. Program

Milestones for M.D./Ph.D. students are essentially the same as those for Ph.D. students, with some exemptions.

<u>Course/activity</u>	<u>milestone</u>
<u>First Year, fall semester</u>	
MCB 700: Analytical Skills	final grade of C or better
IPP 701: Principles of Pharmacology	final grade of B or better
IPP 703: Student Seminar	final grade of B or better
IPP 705: Journal Club	final grade of B or better
IPP 715: Physiological Techniques	satisfactory
IPP 797: Research rotation	satisfactory evaluation
GRAD 713: Found. of Scientific Integrity & Professionalism	satisfactory
GRAD 715: Career Planning in Biomedical Sciences	final grade of C or better
 <u>First Year, spring semester</u>	
IPP 702: Systems Physiology & Pharmacology	final grade of B or better
• MD/PhD students take fewer credits (blocks) compared to PhD students	
IPP 704: Student Seminar	final grade of B or better
IPP 706: Journal Club	final grade of B or better
IPP 798: Research rotation	satisfactory evaluation
GRAD 714: Scientific Integrity & Professionalism	satisfactory
GRAD 716: Seminars in Professional Development	final grade of C or better
IPP Final Exam	pass
 <u>First Year, summer</u>	
IPP 797: Research (rotation)	Satisfactory evaluation
 <u>Second Year, fall semester</u>	
Elective course*	final grade of C or better
IPP 703: Student Seminar	final grade of B or better
IPP 705: Journal Club	final grade of B or better
IPP 741: Quantitative Methods	final grade of C or better
IPP 797: Research	Satisfactory evaluation
 <u>Second Year, spring semester</u>	
IPP 704: Student Seminar	final grade of B or better
IPP 706: Journal Club	final grade of B or better
IPP 798: Research	Satisfactory evaluation
 <u>Second Year, summer</u>	
Research	Satisfactory evaluation
GPA	overall GPA > 2.5
Proposal Defense	pass
IDP	approved

*M.D./Ph.D. students are encouraged, but not required, to take elective courses at any time

Completion of all milestones is required for advancement to Candidacy

IPP Program: Policy on Satisfactory Progress

Established standards of performance and behavior in each course and laboratory activity are essential components of a quality education. Progress towards completion of the Ph.D. or M.S. degree is based on demonstration of academic performance and professional behavior that meets or exceeds the standards described in the following paragraphs. Students must demonstrate, to the satisfaction of the IPP faculty, that they are fit both academically and professionally to be a graduate of the IPP Program. The method by which a student demonstrates progress to the IPP faculty involves timely completion of a series of Milestones. In addition to the defined Milestones, it is assumed that students maintain the highest standards of ethical and professional behavior at all times.

Milestones: Milestones are foundational educational experiences that must be accomplished in a timely manner in order to proceed in the curriculum. Final course grades and assessments of performance in research rotations or in a resident laboratory are used as Milestones in the IPP curriculum. Students must pass all Milestones to complete the IPP program. Students who fail a Milestone must demonstrate successful remediation of that Milestone before proceeding in the IPP program.

Failure to meet any Milestone will result in review of the student's performance by the Student Progress Committee (SPC) for consideration of a change in the student's standing in the program, as described below. In the event a student is permitted to continue in the IPP program following a review by the SPC, the student must successfully demonstrate remediation to competency before proceeding in the IPP program. Students who require remediation to competency for a failed Milestone are not eligible for a grade higher than 'B' for that Milestone.

The Student Progress Committee (SPC) is a standing committee within the IPP Program with membership drawn from IPP faculty. Members serve overlapping terms to provide continuity among the committee. The SPC is charged with (1) reviewing and approving the continuation of students in the curriculum, (2) reviewing and approving students for graduation and (3) reviewing and making decisions regarding students with unsatisfactory academic performance or professional behavior. Meetings, minutes and decisions of the SPC are considered confidential.

The IPP Program Director will, at least semiannually, present to the SPC a list of students for a determination regarding eligibility for continuation in the curriculum. When necessary, the IPP Director will refer a student to the SPC regarding a change in status. Reasons for such a referral to the SPC include failure to accomplish a Milestone in a timely manner, occurrence of unethical or unprofessional behavior, failure to pass remediation of the IPP Final Exam and/or failure to maintain an overall GPA of 3.0. In each case, the IPP Director will provide to the SPC any and all available information regarding the student's past, present and pending academic and/or professionalism issues. The SPC may also obtain additional information from others that it may deem relevant to its review of the concern(s), including but not limited to, opinions of course directors and laboratory rotation advisors and the student's dissertation advisor. The SPC will decide what information is relevant to the case at hand. The IPP Director is not a member of the SPC and will not be present during any deliberation; however, the SPC may, at its discretion, consult the IPP Director during deliberations. The student will retain the right to appear before the committee, and will be invited to so do and to present relevant information on his or her own behalf. Students may elect not to appear, but submit a written statement prior to the SPC meeting when their case will be reviewed. While the student whose performance is being reviewed may have advisors, legal counsel and other individuals available to lend support throughout the process, only the student will be permitted to meet with the SPC.

Following review of any concern referred to the SPC, the SPC will select an outcome or outcomes from the following options:

...if the student is in good standing

Student remains in good standing or is placed on Warning

...if the student is on Warning

Student remains on Warning or is placed on Probation

...if the student is on Probation

Student remains on Probation or is recommended for dismissal

Warning

A student may be placed on Warning by the SPC or by the IPP Director (or his/her designee) without referral to the SPC. This typically occurs when a student in Good Standing fails to complete a single Milestone. A student who is placed on Warning will remain on Warning for a period of 12 months. However, the SPC will review the academic/professional performance of the student 6 months into the Warning period to determine whether the student's performance supports an early termination of Warning status. The student may request to appear before the SPC to present the case that placement on Warning is inappropriate for any reason.

Probation

A student cannot be placed on probation without review by the SPC, which includes a meeting with the student. A student who is placed on Probation will remain on Probation for a period of 24 months. However, the SPC will review the academic/professional performance of the student 12 months into the probationary period to determine whether the student's performance supports an early termination of Probation.

Recommendation for Dismissal

Dismissal from the IPP Program and Graduate School is an undesirable outcome that all parties should work diligently to avoid. If failure of a Milestone or breach of professional behavior results in a student already on Probation to be brought before the SPC, the SPC may recommend that the Dean of the Graduate School dismiss that student from the Program and/or Graduate School. Note that the ultimate action is the decision of the Dean alone; a student cannot be dismissed from the IPP Program or Graduate School by the IPP Director or the SPC.

Other potential recommendations

Other alternatives, such as tutoring, community service, counseling or a leave of absence may be deemed appropriate by the SPC. In extreme cases, the SPC retains the right to skip a step in this process, e.g. recommend that a student in good standing be dismissed.

The decisions of the SPC will be recorded in the minutes of each meeting and transmitted to the IPP Director and, in some cases, the Dean of the Graduate School. All written communication with and notifications to students regarding the SPC's review and decision will be conveyed to the student within 2 business days by the IPP Director (or his/her designee) via the student's Wake Forest e-mail account. Students permitted to continue in the curriculum will do so with the understanding that any concerns regarding the student's academic performance or professionalism will require an additional review by the SPC.

Annual Report, 2017-2018

Integrative Physiology and Pharmacology Graduate Program

1. STUDENT ACCOMPLISHMENTS

The Integrative Physiology and Pharmacology (IPP) program trains PhD and MD/PhD students in a broad range of research areas and methodologies, ranging from molecular to human studies. In addition, IPP offers a Concentration in IPP taken by Master's students from various programs. During the 2017-18 academic year the program consisted of 1 MD/PhD and 25 PhD students, with 11 MS students participating in the Concentration; 2 students earned their PhD in this academic year. The Program's research strengths and teaching contributions align perfectly with the domains emphasized in the Wake Forest School of Medicine (WFSM) Strategic Plan. In particular, the Wake Forest Institute for Regenerative Medicine (WFIRM) and the Hypertension & Vascular Research Center have for several years been two of the three pillars of the IPP Program. The third major area of strength, substance abuse research, has also recently come in line with institutional priorities with the establishment of the Center for Research on Substance Use and Addiction (CRSUA). Beyond these three areas, several IPP faculty and students have been working in the areas of cancer, diabetes and aging.

Productivity and accolades are a consistent characteristic of IPP graduate students. IPP students submitted more than 20 papers for publication in high-quality, peer-reviewed journals during this academic year, with the majority of those the PhD student served as the first author. They also co-authored more than 30 abstracts to professional society meetings, presenting their work as posters or oral presentations. IPP students were supported by a number of sources including NIH F31 grants, NIH T32 training grants and American Heart Association pre-doctoral fellowships, with others being supported by the graduate school (1st year students) and by their participation in R01 and other grants from their research advisors. As of July 1, several students are awaiting word regarding submitted applications for NIH NRSA and foundation-based funding. Students received numerous awards over the past year, including intramural and extramural travel awards that supported their attendance at scientific meetings of professional societies. Other students earned awards for scholarship from scientific societies including the American Society for Pharmacology and Experimental Therapeutics (ASPET), the Radiation Research Society, Research Society on Alcoholism and the Society for Neuroscience as well as NIAAA. IPP students also placed in poster competitions within the WFSM Division of Surgical Sciences and the Cardiovascular Sciences Center, as well as that of ASPET's Division of Neuropharmacology. We are especially proud that third-year IPP student Allison Dyevoich won the Graduate School's "Three Minute Thesis" competition at Graduate Research Day this spring.

2. PROFESSIONAL DEVELOPMENT

Workforce development is an important aspect of the program. This year, many IPP students participated in organized teacher-training activities either as lecturers or tutors serving WFU graduate, undergraduate and PREP students. They also participated in workshops designed to enhance teaching skills. With the encouragement of IPP leadership, one student completed an internship with Ardis Pharmaceuticals (San Jose, CA) and others completed extramural training opportunities offered by the NIH. Other career development activities included various techniques courses and workshops. Perhaps the most impressive accomplishment, a current PhD student (Omeed Rahimi) continued his work as Chief Science Officer of EncepHeal Therapeutics, a company launched in 2016 through the NIH-sponsored "Neuro Start-up Challenge." The company was awarded exclusive license to commercialize a cocaine and methamphetamine addiction treatment technology. Its founders raised \$300,000 in funding via an SBIR grant and \$65,000 via a North Carolina matching grant.

3. SERVICE

Service is also an important component of membership in the IPP Program. Within the program and Graduate School, IPP students have been critically involved in recruitment and orientation activities. They have served the graduate student body with leadership roles and other participation in the Honor Council and the Graduate School Wellness Committee (of which an IPP student is the current Chair), the Graduate Student Association (of which an IPP student is Chair of the Career Development Committee), and the Physiology & Pharmacology Graduate Student Committee (of which IPP students are the Chair and Co-Chair). IPP student Zachary Zabarsky is the Founder and Chair of the Peer Mentoring Program. In addition, IPP students serve local academic functions organized by WFIRM, CRUSA, The Department of Comparative Medicine and the Institutional Animal Care and Use Committee. Extending to the medical school domain, an IPP MD/PhD student is the Co-director of special projects at the DEAC (“Delivering Equal Access to Care,” a student-run free clinic in Winston-Salem).

Nearly every IPP student participated in some form of extramural volunteer/community service directed towards educating local children, from kindergarteners to high school students. For example, several IPP students were active in the Brain Awareness Council, a highly successful student-run organization that organizes visits to local schools to educate young students about the brain and neuroscience research. Other activities include:

- presentation of their dissertation work to middle school students
- “Rescue to Recovery,” which teaches 7th and 8th graders about drugs of abuse and their effects on the brain, Kaleideum North (formerly SciWorks)
- “Program in Community Engagement in STEM,” which coordinates volunteers to give presentations on their professional expertise and career paths to 5th graders
- judging elementary school science fairs
- coordinating a “Road Safety Event” that served over 500 students
- the Hugh O’Brian Youth Leadership Seminar for high school sophomores
- the Math Science Education Network, a summer camp geared towards gifted middle and high school students
- “Tune In to Wellness” a program funded by a wellness grant received by WFSM
- the Wake Forest CTSI’s Community Engagement Program directed at high schoolers

IPP students also participated in fundraising efforts for organizations such as the American Heart Association and for NC Children’s Promise, which funds research on treatments for pediatric cancer.

Other science-related volunteer efforts were directed towards community wellness and education:

- Wake Health Community Ambassadors
- a public outreach day sponsored by the American chapter of TERMIS (Tissue Engineering and Regenerative Medicine International Society).

Students followed their non-science passions in other ways in service to the community, including volunteering time and assistance at St. Leo the Great Catholic Church, Reynolds High School, the Ronald McDonald House, Jefferson Elementary School, Mt. Tabor Preschool and the Forsyth Court senior living facility.

4. IPP PROGRAM STRUCTURE, FUNCTION AND INITIATIVES

During the 2017-18 academic year, program leadership remained consistent. Dr. Paul Czoty continued to serve as Director, while Dr. Jasmina Varagic remained Chair of the Admissions Committee and Drs. Hossam Shaltout and Ann Tallant were co-Chairs of the Curriculum Committee. Dr. Jeff Martin remained Chair of the Student Progress Committee. New additions to the membership of the various committees, and several new IPP faculty members, provided fresh perspectives to the committees and to the program as a whole. During the year, one area in which we made considerable progress is the delineation of requirements of non-PhD students

(i.e., thesis MS, non-thesis MS, MD/PhD and others). One other item of progress that is likely to increase student satisfaction is a streamlining of the process by which we offer Journal Clubs. The Program took a close look at the journal clubs that were being accepted as credit-granting and raised the bar, eliminating some groups and formalizing the others with distinct course numbers.

5. IPP S.W.O.T. ANALYSIS

The IPP program's strengths have been maintained and strengthened over the past year: the comprehensive training program in the principles and applications of physiology and pharmacology and commitment to training students for diverse career paths in industry, academia, and beyond. We have implemented an approach to training that features individualized curriculum development. Course requirements are limited, with the most of the curriculum consisting of electives that match the student's research interest. This ability to customize electives, journal clubs and other opportunities has proven very popular and effective. Quality control is assured by the inclusion of an "IPP Final Examination" at the end of the first year which covers materials in the introductory classes (IPP 701, IPP 702). The "IPP Final Examination" has replaced the program's long-standing Comprehensive Examination which took place at the end of the second year, prior to Advancement to Candidacy. The IPP Program was the only graduate program to have a written comprehensive (or "qualifying") exam. After a great deal of introspection and discussion, the IPP Executive Committee voted to transition to this new "Final Exam" model, which retains the ability to evaluate students' ability to think in an integrated manner, eliminates some of the negative consequences and carries with it other benefits associated with the move to the end of the first year. After two years of this change, it is clear that the move has resulted in decreased stress for students and an acceleration of their progression to doctoral candidates.

We have a breadth of potential mentors/topics of research, and our faculty members have strong teaching and mentoring experience and enthusiasm for graduate education. Our students receive individualized attention (no "factory" laboratories) in research areas relevant to public health needs. Because of our diverse biomedical research, we fit well with the areas of research emphasis within the institution. The increasing demand from pharmaceutical/biotech companies for scientists well trained in the fundamentals of systems physiology and pharmacology is an opportunity, as more development is occurring in smaller companies. Thus, our cross-disciplinary collaborations can lead to workforce development opportunities. The success that our students have experienced in obtaining extramural funding (e.g., NRSAs) and the availability of multiple NIH training grants inspires confidence in our continued ability to support a critical mass of students.

The weaknesses of the IPP program are shared by other graduate programs in the institution. The dispersion of the research laboratories across four or more campuses hinders participation by faculty, who must travel across town to attend the Monday Seminar series and other important student activities. This represents a formidable impediment to establishing cohesive, integrated programs and a spirit of collegiality. Another weakness is the relatively modest budget of the program. Numerous opportunities to enrich our students' educational and social experiences must be abandoned for lack of financial support. For example, due to lack of a concrete line item for seminars, they are typically sporadic, unpredictable, and generally held with poor advance notice by a wide variety of sponsoring departments. This extends to our efforts to recruit new students. The inability to effectively manage our website likely leaves a poor impression on applicants and others researching our program online. Considering the growing importance of social media, the lack of a slick web presence and the absence of an identity on Facebook, Twitter, etc. puts IPP and other programs at a disadvantage in attracting applications and, ultimately, acceptances.

The IPP program has great opportunities for students to take their degree into a wide variety of employment niches. We assess student career development plans early in each student's program, and then to enable students to participate in relevant workforce development activities outside the classroom or the laboratory. We are actively building relationships with community and private sector entities to expand internship activities and are seeking sources for support of such activities via organizations outside of the NIH sources. An exciting opportunity for the IPP Program itself is its alignment with the new institutional Center based on substance abuse and addiction, which launched in 2016. Substance abuse research has long been a major strength of IPP faculty; the resources associated with the institutional center will invigorate our research programs which will undoubtedly have a positive impact on graduate education.

There are minimal threats to the continued success of the IPP program. One prominent source of uncertainty arises from continued low success rates for NIH grant funding. It is not possible for faculty to accurately predict when they will have funding to support students. This could lead to increasing requests to the Graduate School for support of students at a time in which the F&A costs from funded grants are not shared with the graduate school to mitigate the burden during unpredictable funding patterns. A foreseeable and tragic result is that incoming graduate students may not be able to work in the laboratories in which they have the greatest interest because faculty members lack sufficient extramural funding to support a student. This situation also fosters "rich get richer and poor get poorer" scenario because graduate students are essential for the continuance of the research defined in the grant proposals. There are no endowments established for scholarships or awards to cover graduate student support. Donations and endowments are not dedicated to research seminar series or faculty professional development. Fundraising efforts to benefit the graduate school are at best a low priority.

Over the past few years, the institution has spent a great deal on infrastructure to support the Medical School, most notably the beautiful facilities of the Bowman Gray Center for Medical Education in the Innovation Quarter. A similar investment to modernize the Graduate School's facilities would enhance our ability to provide cutting-edge education to PhD and MS students. Considering the dispersion of programs across campuses, the construction that involves the closing of US-421 through downtown Winston-Salem is an emerging concern. It may become extremely difficult for students and faculty to travel between downtown locations (including Biotech Place, 5th@Vine and the PTCRC) and the Bowman Gray campus. IPP leadership has legitimate concerns regarding the impact of this construction on teaching. Development of video conferencing on multiple campuses may help obviate between-campus travel. In addition, expansion of technology to record lectures to the facilities used for graduate teaching would aid those students that have trouble making it to class.

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Resources

WFU Graduate School Student Handbook:

<http://graduate.wfu.edu/docs/academics/GradStudentHandbook.pdf>

Common forms:

- Research Evaluation form:
http://internal.graduate.wfu.edu/Forms/BG%20Campus/LabResearch_assessment.pdf
- Application for Candidacy:
http://internal.graduate.wfu.edu/Forms/BG%20Campus/BG_Candidacy_PhD.pdf
- Alumni Travel Award application:
http://internal.graduate.wfu.edu/Forms/BG%20Campus/Alumni%20Travel%20Award_BG.pdf

Wellness & Safety:

- Student Wellness Center: <http://graduate.wfu.edu/students/SWC.html>
- CareNet Counseling Services: http://graduate.wfu.edu/students/bg_carenet.html
- Health and Effectiveness Council: <https://ewake.wakehealth.edu/hec/>
- Sexual Offense Prevention and Response website:
<http://intranet.wakehealth.edu/Departments/SOPR/>
- Security Intranet site (personal tips and crime log):
<http://intranet.wakehealth.edu/Departments/Security/>

Additional resources: <http://graduate.wfu.edu/students/>