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I. Mission

The MD/PhD Program at Thomas Jefferson University is a dual degree program that prepares students for careers in academic medicine.

Our program aims to provide our students with the skills to provide outstanding patient care, lead discovery in biomedical research, advocate for basic and translational research, assume leadership roles in biomedical research and the delivery of health care, and serve as role models for the next generation of physician scientists.

Our goal is to produce motivated and enthusiastic physician investigators who will elect a life-long career in biomedical research, translating fundamental discoveries into improved health care delivery, and serving as role models for the next generation of investigators.

II. Structure of the Program

TJU MD/PhD Administration

<table>
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<th>Name</th>
<th>Position in Program</th>
<th>Academic Position</th>
<th>Contact Information</th>
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<tbody>
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</table>

Our administrative structure allows greater control and involvement in setting standards and requirements for the both MD and PhD degrees. Administrative oversight for the Program is provided by the MD/PhD Steering Committee, chaired by Dr. Gerald Grunwald, Dean of the Jefferson College of Life Sciences and Professor of Pathology, Anatomy & Cell Biology, and is composed of faculty, including the Co-Directors, involved in the scientific and/or clinical training of MD/PhD students. Members of the committee include: Clara Callahan, MD, Associate Dean for Admissions in the SKMC and Professor, Department of Pediatrics; Susan Rosenthal, MD, Associate Dean for MD/PhD Students in the SKMC and Professor, Department of Pediatrics; Ross Summer, MD, Division of Pulmonary and Critical Care Medicine; and Diane Merry, PhD, Professor of Biochemistry & Molecular Biology. Administrative members include Joanne Balitzky, Administrative Director of the MD/PhD Program; Bonnie Emilius, Director of Admissions for SKMC;
and Marc Stearns, Director of Admissions for the Jefferson College of Life Sciences. There are two student representatives to this committee, elected by the JPSA.

Day-to-day administrative duties are carried out by the Program Office, comprising the co-Directors and the Administrative Director. The Program Office closely coordinates all administrative functions, program meetings, and program activities.

The Administrative Director maintains student records and provides administrative support to the Program co-Directors. The Administrative Director also assists the Jefferson Physician Scientist Association with organizing their planned activities.

III. Financial Support of MD/PhD Students

Students in the MD/PhD Program receive fellowship support for each year in the Program. This support provides for full college tuition as well as a stipend for living expenses. The fellowship support is renewable for each year in the Program, provided the student maintains the high level of academic performance required by the Program.

During the medical school years, stipend support is provided through SKMC. Upon transition to graduate study, support will be through Jefferson College of Life Sciences for the Fall term only. Thereafter, and in all remaining PhD years students receive their stipend support from their PhD mentors. The MD/PhD Program has a policy that no mentor can have more than 2 MD/PhD students at one time, and no more than 1 from a single class. Exceptions to this policy may be granted under unusual circumstances.

Students are required, in consultation with their research advisors, to identify appropriate sources of extramural support and to apply for Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral MD/PhD or Other Dual-Doctoral Degree Fellowships (F30). However, funding within the program does not depend on receiving such support. It is important to note that there are specific time limitation and eligibility requirements for the F30.

Stipends are disbursed bi-weekly or monthly depending upon the funding source. As described above, funding sources will vary during time in the Program; students should be prepared to complete forms and/or receive different numbers of checks as funding source changes. Checks can be retrieved from the Jefferson College of Life Sciences Finance Office located in room M63 Jefferson Alumni Hall. Any questions regarding stipend should be directed to the Finance Office at 215-503-0150.

The following items are included in the MD/PhD Fellowship:

Stipend: $29,580 (2017-2018 Academic Year)

Tuition and Fees: As appropriate for the school (SKMC or Jefferson College of Life Sciences) of current enrollment.

Health and Dental Insurance: Not as part of the fellowship during SKMC years; health coverage during PhD years is for student only. The student pays for health
insurance during SKMC years. During PhD years the student can pay an additional amount for dental coverage and / or dependent health coverage.

IV. MD/PhD Advising

MD/PhD advising is not meant to duplicate or interfere with the primary guidance provided by the SKMC Office of Student Affairs, PhD thesis mentor, student’s research committee, or PhD Program responsible for each student. Instead, MD/PhD advising centralizes these activities, to ensure that each student makes appropriate progress and satisfies the expectations of the MD/PhD Program.

Students will meet regularly with the MD/PhD co-Directors to review progress, academic and research achievements, program and professional plans, and changes and concerns.

During SKMC 1 and 2 students are advised by the MD/PhD co-Directors, in regular one on one meetings and group meetings. Meetings will focus on academic performance, integration into MD/PhD program specific curricular elements, personal well-being, selection of rotation mentors and laboratories, progress toward successful completion of USMLE Step 1, transition into the research phase of the program, and final selection of a thesis mentor and PhD Program.

During the PhD years, regular meetings with the MD/PhD co-Directors will continue, but primary guidance will be through the research committee. One member of the MD/PhD Steering Committee will be assigned to the research committee as an 'ex-officio' member, representing the MD/PhD Program. This member should always be notified of committee meetings as are the regular members of your committee.

V. Activities

A number of MD/PhD Program specific activities supplement the training provided by SKMC and Jefferson College of Life Sciences. These activities are instrumental in establishing a core identity, promoting the unique development of physician scientists and allowing them to identify with a cohort group with similar goals and interests. (See Appendix H)

- **Translational Research Journal Club** meets monthly to provide opportunities for students in the MD/PhD program to read, interpret, synthesize, and present literature in translational science to peers and faculty. The journal topics specifically focus on translational research appearing in the highest impact scientific journals.
- **Progress in Translational Research Seminar** meets monthly to allow students to present the results of their ongoing thesis research. Research presentations highlight the translational applications of the research that will solve a clinical problem, impact patient care, or prevent disease in individual patients or populations.
- **Case Studies in Molecular Medicine** meets monthly to provide concrete case studies in which novel molecular concepts are applied to the development of new diagnostic and therapeutic modalities for patient management. This program challenges trainees to think critically about the realistic and practical applications of laboratory-based discoveries and provides a context for the processes, steps and timelines required for translation from bench to bedside.
• **Physician Scientist Mentorship Series** provides an opportunity for MD/PhD students to learn from active, successful and productive physician scientists about training opportunities, career pathways, and the integration and balance of laboratory and clinical activities and personal/professional life. Beyond these elements, this series also offers network opportunities and exposure to the science of eminent regional and national investigators. These talks are presented semi-annually in an informal, intimate and collegial dinner setting.

• **Enrichment Course in Clinical Skills** ensures the training and preparedness of MD/PhD students entering the clinical clerkship years of medical school and facilitates the transition from graduate school back into medical school. All trainees enroll in the Enrichment Course in Clinical Skills (GC 725) during their research years.

• **MD/PhD Scholars Retreat** annually provides an opportunity to showcase the scientific achievements of the students, disseminate important programmatic information in a peer-to-peer fashion, provide mentoring opportunities and further build community. Students from all stages of training are given the opportunity to present to and learn from other students. A keynote speech by an active physician scientist whose primary charge is to provide career insights. The evening includes dinner and social activities. Retreat program and activities are planned and organized by the Jefferson Physician Scientist Association (JPSA) in conjunction with the co-Directors.

• **Annual Orientation**. MD/PhD program students have a separate orientation for an afternoon and evening, organized around a welcome barbecue. The afternoon is spent meeting their fellow students from all phases of the MD/PhD program. Experienced (upper class) students present information regarding specific elements of the program, including requirements, operations, and responsibilities. New matriculants learn about the preclinical training phase, the integration of MD/PhD program components, and the strategies and logistics of organizing rotations. There is time built into the orientation specifically for small group interactions to discuss survival skills in the earliest phases of training. After dinner, social activities are planned for attendees. Orientation is organized by JPSA under the direction of the co-Directors. The **American Physician Scientist Association (APSA)** is a national organization dedicated to addressing the needs of future physician scientists with respect to their training and career development. Founded in 2003, APSA held its first Annual Meeting in 2005 and has grown tremendously in the ensuing years. APSA strives to be the student physician-scientists’ leading voice for improving educational opportunities, advancing patient-oriented research, and advocating for the future of translational medicine; as such it is a student led organization, by trainees, for trainees. Jefferson has an institutional membership so all students in the MD/PhD Program are APSA members.
VI. Jefferson Physician Scientist Association

The Jefferson Physician Scientist Association (JPSA) was founded in Fall 2010 with the purpose of advancing the future of translational medicine and representing the position of MD/PhD student in academic and extracurricular matters. Membership includes all students enrolled in the MD/PhD Program who are primarily recruited at the annual MD/PhD orientation and welcome in early fall of each academic year. Officers are elected annually.

- President (2018-2019): Brittany Charsar
- Secretary (2018-2019): Selin Isguven
- Treasurer (2018-2019): Colleen Isabelle
- VP for Clinical Enrichment (2018-2019): Noor Shaik
- VPs for Recruitment (2018-2019): Jeff Rappaport and John Flickinger
- APSA Institutional Representatives: Rogan Magee and Jon Gorky

Academic Affairs: Sit on the MD/PhD Steering Committee and represent students at all stages of the program; serve as the leading student voice for recruiting, admissions and MD/PhD program direction and development. Organize 3 annual seminars: “Bench to Bedside”; “How to Choose Your MD/PhD Rotations”; “Clinical Rotations in Research”.

Career Development: Plan and organize seminars on translation topics related to interests of JPSA members; promote a culture of translational medicine at TJU by developing relevant opportunities for PhD students (clinical mentor program) and MD students (“How to publish” seminar and “Journal Club” series).

Community and Cultural Affairs: Coordinate efforts to interact with groups and individuals outside the JPSA community; creating and maintaining an alumni network; serves as president of MD/PhD Social Committee; spearhead all social activities related to the annual retreat.

Recruitment: Represent students on admissions committee (non-voting); develop and organize interview days; 2nd look visits, and be the interface between applicants and current students.
VII. Student Requirements

While ALL students are encouraged to participate in JPSA and recruiting activities while they are in the Program, the following are minimal requirements for graduation.

First Year

1. Attend MD/PhD Orientation
2. Attend Welcome Barbecue
3. Attend weekly meetings of Current Topics in Translational Biomedical Research each semester/session (students are automatically registered for GC 710 (F), 712 (Sp 1), 714 (Sp 2) and receive 3 credits in Jefferson School of Life Sciences).
4. Attend Annual Retreat
5. Attend Physician Scientist Dinners
6. Attend periodic meetings with MD/PhD co-Directors as required.
7. Research rotation: This is a key decision for first year students and must be done in consultation with MD/PhD co-Directors. Two 8-week research rotations are required. The first rotation must be completed the summer prior to the start of SKMC 1 and the second rotation must be completed in the summer after Phase 1 of JeffMD as part of the JeffMD Scholarly Inquiry requirement.
8. Successfully complete all coursework requirements.
9. Complete research rotation reports.

Second Year

1. Continue attendance at weekly meetings of Current Topics in Translational Biomedical Research each semester/session (students are automatically registered for GC 710 (F), 712 (Sp 1), 714 (Sp 2) and receive 3 credits in Jefferson College of Life Sciences).
2. Attend Welcome Barbecue
3. Attend Annual Retreat
4. Attend Physician Scientist Dinners
5. Attend periodic meetings with MD/PhD co-Directors as required.
6. Select a mentor and PhD Program after meeting with the MD/PhD co-Directors. As you make your decision, please note that the MD/PhD Program has a policy that no mentor can have more than 2 MD/PhD students at one time, and no more than 1 from a single class (see previous, p. 4). Since most thesis mentors participate in more than one PhD Program, decisions about which Program to select are based on discussions with the mentor, PhD Program Directors and MD/PhD co-Directors.
7. Successfully complete all coursework requirements.
8. Successfully complete USMLE Step 1 within the same time frame as current class cohort and before beginning PhD studies.

Third Year through Completion of PhD

1. Continue attendance at weekly meetings of Current Topics in Translational Biomedical Research each semester/session; register for GC 710 (F), 712 (Sp 1), 714 (Sp 2), 1 credit each semester.

2. Attend Welcome Barbecue

3. Attend Annual Retreat

4. Complete Annual Professionalism Review

5. Attend Physician Scientist Dinners

6. Register and participate as appropriate in GC 725 Enrichment Course in Clinical Skill each Fall and Spring semester (2 credits each year).

7. Form research committee, including one ex-officio MD/PhD representative

8. Submit application for Ruth L. Kirschstein Individual Predoctoral National Research Service Award Fellowship (F30 for MD/PhD, preferred, or F31 for PhD or equivalent Fellowship).

9. Attend Ethics Case Conferences once a month during third year of PhD studies (fifth year in MD/PhD Program)

10. Optional: GC 630 - Fundamentals of Clinical Trials

11. Optional Rotation on the Cancer Clinical Research Review Committee

12. Optional Rotation at Annals of Internal Medicine

13. Successfully complete all PhD requirements as set forth by the selected PhD Program including
   a. required coursework
   b. regular research committee meetings
   c. comprehensive examination

14. Have at least 1 first author paper accepted for publication

Nearing the End of PhD

1. The Administrative Director will poll 4th year PhD students regarding return to SKMC 3. In order to return to SKMC 3, returning students must complete the thesis defense and all associated requirements by mid-April and participate in the mandatory structured clinical re-immersion program provided by SKMC. See Appendix

2. Notify Administrative Director of the thesis defense date

3. Successfully complete defense of thesis including all PhD Program and Jefferson College of Life Sciences requirements by March 1 in order to return to SKMC 3 in mid-April.
4. Complete the mandatory structured clinical re-immersion program provided by SKMC prior to returning to SKMC 3.

Program Years 7 and 8: The Clinical Years

1. Present one Clinical Case Study in Molecular Medicine each year. Continue weekly attendance at Current Topics in Translational Biomedical Research as clinical schedule allows.
2. Attend Welcome Barbecue
3. Attend Annual Retreat. If unable to attend due to a professional conflict, notify the Administrative Director in advance.
4. Successfully complete SKMC requirements

VIII. Curriculum

A critical aspect of our MD/PhD Program is the integration of physician-scientist training across all years. Descriptions of SKMC curriculum can be found in the SKMC Handbook and course catalog available at http://www.jefferson.edu/university/skmc/student-resources.html

A total of 70 credits are awarded for the first two years of regular medical school coursework, accounting for a substantial number of the credits required for the PhD thesis. Additional didactic credits and research credits are awarded for MD/PhD specific coursework. Thus, MD/PhD students should be able to fulfill most remaining coursework early, providing significant time for bench research. Some courses are required of MD/PhD students in all PhD Programs and are listed below; other requirements are Program specific. As much of remaining coursework as possible should be completed during CBS 1.

MD/PhD Specific Courses

- GC 710, 712, 714 -- Current Topics in Translational Biomedical Research I, II, III (1 cr. each, F, S1, S2) This course explores aspects of translational research and molecular medicine through the venues of Translational Research Journal Club, Progress in Translational Research Seminar, Ethics Case Conference, and Case Studies in Molecular Medicine. Meets 4 times per month. It is required in each year of PhD studies.

- GC 725 - Enrichment Course in Clinical Skills for Physician Scientists (1 cr. each, F, S) The course is composed of a variety of clinical options in which trainees participate over the 4 years of the research phase to foster and enrich the students’ clinical skills. Trainees can provide monthly service to JeffHope, a resident-run clinic that provides healthcare to the underserved urban populations in Philadelphia. Also, they can participate in physical diagnosis rounds and morning report. Physical diagnosis rounds involve patients admitted to the medical services of Thomas Jefferson University Hospital. On these rounds, also attended by a small group of medical residents, trainees are exposed to a diverse group of patients where auscultatory, visual, and tactile skills are practiced. Following rounds,
morning report occurs, where case presentations are used to develop differential diagnosis skills. Further, trainees can work with one master clinician (from a selected list of physician mentors) each month, across specialties, for one day, seeing patients, reviewing histories and physicals, interpreting laboratory studies, and synthesizing data to formulate diagnoses and management plans. These rotations are required, attendance is mandatory and recorded. It is required in each year of PhD studies.

- **Optional GC 630 -- Fundamentals of Clinical Trials (3 cr.)** This course introduces the fundamentals of design and analysis of clinical trials. Some of the design issues discussed include specifying and operationalizing the scientific question of interest, the role of a control group randomization, blinding, and sample size determination. The course focuses on statistical aspects of the analysis of clinical trials, including various statistical estimation and testing procedures, the intent to treat principle, interim analysis, and statistical and scientific inference. Students learn to critically review published reports of clinical trials through participation in small group discussions and individual written critiques. This is a required course usually taken during the third year of PhD studies.

- **Optional Rotation on the Cancer Clinical Research Review Committee (CCRRC)** This committee of the Kimmel Cancer Center evaluates the scientific validity of patient-oriented studies in oncology at TJU. Rotation on this biweekly committee is an opportunity to obtain hands-on experience reviewing the scientific merit of clinical protocols. Trainees are supervised by Dr. SA Waldman, the Chairperson of the CCRRC, who guides analyses, addresses questions, and provides feedback. Trainees rotate on the CCRRC for 6 one hour meetings.

- **Critical Review of the Scientific Literature Optional Rotation** The Annals of Internal Medicine is the flagship publication of the Philadelphia-based American College of Physicians-American Society of Internal Medicine (ACP-ASIM). It is considered the premiere worldwide internal medicine journal. Editor Christine Laine, MD, MPH has offered members of the MD/PhD Program unprecedented access to the editorial process through a 4-week rotation. Enrollees can participate in the weekly editorial and statistical meetings of the journal. Maximal benefit of the rotation is obtained when participants read a majority of the articles being discussed. Therefore, participants should schedule this optional rotation during a period when they have the time to devote to preparation for each session.
IX. PhD Programs

The doctoral programs within the Jefferson College of Life Sciences offer cutting edge interdisciplinary education and research training under the mentorship of nationally and internationally recognized faculty. The Director of the selected Program along with the MD/PhD co-Directors oversees the student’s PhD training. In addition to selecting a mentor for PhD thesis research, each student will need to choose a PhD Program. This decision should be made in consultation with the thesis mentor, the MD/PhD co-Directors, and the Director of the PhD Program of interest. Many mentors participate in more than one PhD Program; thus multiple PhD Program Directors may need to be consulted before reaching a final decision. Visit the Jefferson College of Life Sciences website for more information.

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<tr>
<th>Name of Program</th>
<th>Program Director</th>
<th>Contact Information</th>
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<tr>
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X. PhD Program Requirements for MD/PhD Students

The PhD degree requires the completion of 180 credits: 54 topical course credits including 18 outside the chosen program with the remainder being research credits. Because of credit transfer from SKMC and graduate credits earned during SKMC year 1 and 2 MD/PhD students usually easily fulfill minimal credit requirements. Course recommendations below were developed specifically for MD/PhD students. Admission to PhD candidacy requires successful completion of a Comprehensive Examination. The Thesis Defense requires a written thesis and both a public and private defense of the thesis.
1. Biochemistry & Molecular Pharmacology
Director: Michael Root, M.D., Ph.D.

The Biochemistry & Molecular Pharmacology PhD Program employs a multidisciplinary approach to train students in the rigors of experimental biomedical sciences and to prepare them for independent research careers. The curriculum is designed to convey the fundamentals of biochemistry, molecular biology, pharmacology, cell biology, and genetics. The education is reinforced at the bench in cutting-edge research laboratories broadly grouped into three research emphases: Molecular and Cellular Pharmacology, Chemical and Structural Biology and Molecular Biology and Gene Regulation. Students graduating from this program will have the comprehensive scientific foundation and technical expertise to excel in all areas of biomedical research.

- BI 525 -- Genetic Information Transfer -- 3 credits
- BI 710/720/730 – Seminar -- 1 credit each term until permission to write thesis
- BI 715/725/735 – Current Literature -- 1 credit each term for 9 terms
- BI 910/920/930 – Research -- variable credit
- GC 640 -- Research Ethics -- 1 credit
- GC 665 – Cell Signaling -- 4 credits
- GC 730 -- Planning & Writing a Research Grant -- 1 credit
- NS740 -- Applied Statistics in Neuroscience -- 2 credits
- PR 613 -- Macromolecular Structure & Function I -- 3 credits

2. Cell Biology and Regenerative Medicine
Co-Directors: Nancy Philp, Ph.D. and Makarand Risbud, Ph.D.

The Cell Biology and Regenerative Medicine Program is intended for students of outstanding ability who are preparing for a career that includes research in cell biology, developmental biology, pathobiology of disease and regenerative medicine.

- CB 616/626/636 - Current Topics Molecular Cell Biology - 1 credit each
- CB 710/720/730 – Seminar - 1 credit each
- CB 910/920/930 – Research - variable credit
- GC 640 -- Research Ethics -- 1 credit
- GC 645 Computational Genomics and Bioinformatics I – 3 credits
- GC 660 -- Statistical Methods for Data Analysis -- 3 credits
- GC 665 – Cell Signaling -- 3 credits
- GC 720 – Scientific Writing – 2 credits
- GC 730 -- Planning & Writing a Research Grant -- 1 credit
- TE 531 – Basic Concepts of Tissue Engineering and Regenerative Medicine – 2 credits (only if supported by Dr. Shapiro’s Training Grant)
- TE 624 -- Extracellular Matrix – 2 credits

Continue participating in current topics, seminar and research until graduation.
3. Genetics, Genomics, & Cancer Biology
Director: Lucia Languino, Ph.D.

The Genetics, Genomics, & Cancer Biology program is designed to take a multidisciplinary approach to the field by providing the student with a strong basic knowledge of genetics, biochemistry, molecular biology, cell biology and cancer biology with additional exposure to other areas of related interest. The ultimate goal of this program is to provide aspiring students with the background, training and experience necessary to launch careers as independent scientific investigators.

- GC 640 -- Research Ethics -- 1 credit
- GC 645 -- Genomics & Bioinformatics -- 3 credits
- GC 675 -- Cancer Immunology -- 2 credits (exempt from IMP 505A prerequisite)
- GC 730 -- Planning & Writing a Research Grant -- 1 credit
- GE 612 -- Genetics of Model Organisms -- 3 credits
- GE 636 -- Regulation of Cell Cycle and Apoptosis -- 3 credits
- GE 637 -- Advanced Human Genetics -- 3 credits
- GE 652 -- Tumor Cell Signaling -- 2 credits
- GE 710/720/730 – Seminar -- 1 credit each
- GE 910/920/930 -- Research -- variable credit
- NS740 -- Applied Statistics -- 3 credits

4. Immunology & Microbial Pathogenesis
Director: Jianke Zhang, Ph.D.

The IMP Program is designed to take a multidisciplinary approach to the field by providing the student with a strong basic knowledge of immunology, microbiology, biochemistry, cell biology, and molecular biology, with additional exposure to other areas of related interest. The ultimate goal of this program is to provide aspiring students with the background, training and experience necessary to launch careers as independent scientific investigators.

- GC 640 -- Research Ethics -- 1 credit
- GC 730 -- Planning & Writing a Research Grant -- 1 credit
- IMP 505 B –Immune System in Health and Disease -- 2 credits*
- IMP 530 -- Infection and Immunity -- 3 credits
- IMP 605 -- Advanced Cellular & Molecular Immunology -- 3 credits*
- IMP 600B -- Virology -- 3 credits
- IMP 710/720/730 – Seminar -- 1 credit each
- IMP 712/722/732 – Current Literature in IMP -- 1 credit each
- IMP 910/920/930 – Research -- variable credit
- NS740 -- Applied Statistics in Neuroscience -- 3 credits

* discuss requirement with Program Director, may not be necessary
5. Neuroscience
Co-Directors: Kyunghee Koh, Ph.D. and Angelo Lepore, Ph.D.

This interdisciplinary program offers students the opportunity to conduct research in diverse areas, including neurodegenerative disorders, neuropathic pain, circadian cycles, synapse development, epilepsy, neuropharmacology, etc.

- NS 530 Neuroanatomy
- GC 640 Research Ethics (CRN 70263) 1 credit
- GC 730 Planning & Writing a Research Grant 1 credit
- NS 601 Profiles in Neuroscience Research 1 credit
- NS 616, 626, 636 Journal Club 1 credit each
- NS 690 Neuropharmacology 3 credits
- NS700 Cellular Neurophysiology 3 credits
- NS 710, 720, 730 Seminar Series 1 credit each
- NS 715 Cellular & Molecular Neuroscience 3 credits
- NS740 Applied Statistics in Neuroscience 3 credits
- NS 910/920/930 Research variable credit

Continue participating in Journal Club and Seminar in Years 3 and 4.

Individually, all students take the comprehensive exam by the end of the second year of enrollment in the graduate program. To initiate the process, the student submits a one-page abstract of his/her intended thesis work to the Curriculum Committee (typically by the end of Spring I of the second year of study). MD/PhD students may take the comprehensive exam by the end of the first year in the PhD program. If a student wishes to pursue this option, she/he and her/his thesis advisor must consult with the Directors of the Neuroscience Program.

Course Descriptions PhD Program Course descriptions are available on specific Program websites:
http://www.jefferson.edu/university/biomedical-sciences/degrees-programs.html
Thomas Jefferson University MD/PhD Program Organizational Chart

External Advisory Board
*Perry Halushka, MUSC*, Chair
Robert Siliciano, JHSM
Sharon Welling, JHSM
Paul Insel, UCSD
Lawrence (Skip) Brass, U PA

Steering Committee
JCLS Dean, Chair
Executive Subcommittee
Faculty Representatives
JPSA Representatives

Program Office
Co-Directors
Administrative Director

Executive Subcommittee
S. Waldman, Chair
Co-Directors
Administrative Director
SKMC Dean of Admissions
SKMC Associate Dean for MD/PhD Students
JCLS Dean

Admissions Subcommittee
Co-Directors
Administrative Director
PhD Program Directors

Progress Subcommittee
JCLS Dean, Chair
Co-Directors
Administrative Director
SKMC Associate Dean for MD/PhD Students

Curriculum Subcommittee
Co-Directors
JCLS Dean
Administrative Director
JPSA Representatives

Jefferson Physician Scientists Association (JPSA)

Program Office
Co-Directors
Administrative Director

MUSC - Medical University of South Carolina
JHSM - Johns Hopkins School of Medicine
UCSD - University of California, San Diego
U PA – University of Pennsylvania
## MD/PhD Program Specific Requirements by Year

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>JeffMD Phase 1</th>
</tr>
</thead>
</table>
|        | **• Summer Research Rotations** - Must be completed in the summer prior to Year 1 JeffMD Phase 1 and the summer prior to Year 2 JeffMD Phase 1. Two 8 week research rotations are required.  
**• MD/PhD Orientation and Welcome Barbecue**  
**• Current Topics in Translational Biomedical Research**  
  o Student Research Seminar – 1st Monday, noon  
  o Case Study in Molecular Medicine – 2nd Wednesday, 5pm  
  o Translational Research Journal Club – 4th Wednesday, 5 pm  
**• MD/PhD Retreat – usually October, Saturday all day**  
**• Physician Scientist Dinners** |

<table>
<thead>
<tr>
<th>YEAR 2</th>
<th>JeffMD Phase 1</th>
</tr>
</thead>
</table>
|        | **• MD/PhD Orientation and Welcome Barbecue**  
**• Current Topics in Translational Biomedical Research**  
  o Student Research Seminar – 1st Monday, noon  
  o Case Study in Molecular Medicine – 2nd Wednesday, 5pm  
  o Translational Research Journal Club – 4th Wednesday, 5 pm  
**• MD/PhD Retreat – usually October, Saturday all day**  
**• Physician Scientist Dinners**  
**• Complete USMLE Step 1 before June 30 but at latest must be taken prior to the first day of JeffMD Phase 2 for your entering class**  
**• Identify Thesis Research Mentor and PhD Program** |

<table>
<thead>
<tr>
<th>YEARS 3 – 6</th>
<th>JCLS 1 - 4</th>
</tr>
</thead>
</table>
|             | **• Continue attendance at weekly meetings of Current Topics in Translational Biomedical Research each semester/session; register for GC 710 (F), 712 (Sp 1), 714 (Sp 2), 1 credit each semester.**  
**• Attend Welcome Barbecue**  
**• Attend Annual Retreat**  
**• Attend Physician Scientist Dinners**  
**• Register and participate as appropriate in GC 725 Enrichment Course in Clinical Skill each Fall and Spring semester (2 credits each year in JCLS).**  
**• Form research committee, including one ex-officio MD/PhD representative**  
**• Submit application for Ruth L. Kirschstein Individual Predoctoral National Research Service Award Fellowship (F30 for MD/PhD, preferred, or F31 for PhD or equivalent).**  
**• Attend Ethics Case Conferences once a month during third year of PhD studies (fifth year in MD/PhD Program)**  
**• Optional GC 630 - Fundamentals of Clinical Trials**  
**• Optional Rotation on the Cancer Clinical Research Review Committee**  
**• Optional Rotation at Annals of Internal Medicine**  
**• Successfully complete all PhD requirements as set forth by the selected PhD Program including**  
  o required coursework  
  o regular research committee meetings  
  o comprehensive examination  
**• Have at least 1 first author paper accepted for publication** |

<table>
<thead>
<tr>
<th>YEARS 7 – 8</th>
<th>JeffMD Phase 2 and 3</th>
</tr>
</thead>
</table>
|             | **• Present one Clinical Case Study in Molecular Medicine each year**  
**• Continue weekly attendance at Current Topics in Translational Biomedical Research as clinical schedule allows.**  
**• Attend Welcome Barbecue**  
**• Attend Annual Retreat. If unable to attend due to a professional conflict, notify the Administrative Director in advance.**  
**• Successfully complete SKMC requirements** |
## Synopsis of Research Performed During Summer Lab Rotation

<table>
<thead>
<tr>
<th>STUDENT:</th>
<th>MENTOR:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Signature:</td>
<td>Mentor Signature:</td>
</tr>
</tbody>
</table>

**Synopsis:** limit text to box:
FACULTY EVALUATION OF LABORATORY ROTATIONS

Name of Student: ______________________  Period of Rotation: __________

Name of Preceptor: ____________________

1 = Excellent  2 = Acceptable  3 = Below Expectations

1. a) Effort during rotation period

b) Ability to organize available time

c) Ability to conceptually grasp the aims of the rotation

d) Ability to learn methods

e) Experimental precision and accuracy

f) Ability to interpret results

g) Ability to amicably work alongside others in laboratory

h) Success in achieving and completing goals set for rotation

2. Overall prediction of this student’s potential to do independent research.

3. Please list in order of importance your opinion of this student’s greatest strengths and weaknesses.

4. Final Grade (Satisfactory / Unsatisfactory): __________

Signature:__________________________________
Confirmation of Thesis Advisor and PhD Program

To: MD/PhD Program (910 BLSB)

I am willing to serve as Research Advisor for
__________________________________________, an MD/PhD student in the
__________________________________________ PhD Program. I understand that
beginning January 1, 2019 I will be responsible for the financial support of my
student and that JCLS Administration will ask me to supply a charge code for
student support when fellowship awards are prepared.

Signature of Research Advisor __________________________ Date

__________________________
Printed Name of Research Advisor

Signature of Advisor’s Department Chairperson __________________________ Date

__________________________
Signature of PhD Program Director Date
Annual Professionalism Evaluation form for MD/PhD students

Student name ____________________________________________
(type or print legibly)

Date ______________________ Year in PhD program__________

PI____________________________________________________

Date this form was discussed with the student ______________

This is an annual review to reiterate the importance of professionalism in all aspects of training. Please circle appropriate category; Comments are required.

1. Reliability and responsibility
   a. Performs reliably and responsibly in all aspects
   b. Needs further education or assistance with the following:
      1. Fulfilling responsibilities in a reliable manner
      2. Consistently arriving late to commitments
      3. Learning how to complete assigned tasks
      4. Fails to notify staff in a timely manner of absences
      5. Repeatedly fails to respond to communications with staff or faculty
      6. Violates official graduate program policies

2. Self-improvement and adaptability
   a. Understands the importance of self-improvement and adaptability and exhibits appropriate behaviors described below
   b. Needs further education or assistance with the following:
      1. Accepting constructive feedback
      2. Recognizing limitations and seeking help
      3. Being respectful of colleagues
      4. Incorporating feedback in order to make changes in behavior
      5. Adapting to change
      6. Relating well to faculty in a learning environment
3. Honesty and integrity
   a. Performs all duties with complete honesty and integrity
   b. Needs further education or assistance with the following:
      1. Does not inform supervisor when mistakes occur
      2. Taking credit for the work of others
      3. Misrepresents or falsifies data/information

This section is to be completed by faculty advisor, program director and/or administrative staff:
Comments & Suggestions for Change:

This section is to be completed by the student.

I have read this evaluation and discussed it with my supervisor

Student signature ____________________________________________

Faculty advisor ______________________________________________

Date _______________________________________________________

My comments: (optional)
GC 710, 712, 714 - Current Topics in Translational Biomedical Research I, II, III - 1 credit each

Course Coordinators: Dr. Waldman, Dr. Covarrubias

The course meets three or four weeks per month during each session: Fall, Spring 1 and Spring 2

Course Components and Schedule:

**Progress in Translational Research Seminar** - 1st Monday; 12-1 PM

Allows students to present the results of their ongoing thesis research. Research presentations highlight the translational applications of the research that will solve a clinical problem, impact patient care, or prevent disease in individual patients or populations.

**Case Studies in Molecular Medicine** - 2nd Wednesday; 5-7 PM

Provides concrete case studies in which novel molecular concepts are applied to the development of new diagnostic and therapeutics modalities for patient management. This program challenges trainees to think critically about the realistic and practical applications of laboratory-based discoveries and provides a context for the processes, steps and timelines required for translation from bench to bedside.

**Ethics Case Conference** - 4th Tuesday; 12-1 PM Required while in JCLS 3 (year 5 of MD/PhD Program)

MD/PhD trainees participate in a monthly conference that focuses on ethical issues in research and medicine. The format for these conferences is small group discussion and case-based. Faculty and trainees select pre-reviewed case studies from the literature that form the focus for directed discussion at the conference. The specific focus of these conferences is experimental research ethics. Faculty mentors provide guidance in the development of the presentation and provide trainees with constructive criticism.

**Translational Research Journal Club** - 4th Wednesday; 5-7 PM

Provides opportunities for students in the MD/PhD program to read, interpret, synthesize, and present literature in translational science to peers and faculty. The journal topics specifically focus on translational research appearing in the highest impact scientific journals.

Evaluation: Students are evaluated for attendance, participation and presentation skills. Grading is Satisfactory / Unsatisfactory.
MD/PhD Program - Evaluation of Journal Club

Date:

Presenter Name:

Reviewer (circle one): Faculty Student

How complete, concise and clear was the background/introduction? Should anything have been left out or included?

How clear, complete and concise was the presentation of the paper? Make suggestions for improvement.

How insightful and clear was the conclusion and the discussion? How well was the paper criticized? How well were the impact and future directions of the paper presented? How well did the presenter field questions?

Article Selection

Please comment on the overall presentation including discussion (1=BEST, 5=NEEDS IMPROVEMENT):

1 2 3 4 5

Final comments:
Annals of Internal Medicine Rotation (Optional)
K30 Training Program in Human Investigation

Introduction:
The Annals of Internal Medicine is the flagship publication of the Philadelphia-based American College of Physicians. It is considered the premiere worldwide internal medicine journal. Editor in Chief Christine Laine, MD, MPH, a faculty member at Jefferson, has offered members of the MD/PhD program unprecedented access to the editorial process through a 4-week rotation. Enrollees can participate in the weekly editorial and statistical meetings of the journal. Maximal benefit of the rotation is obtained when participants read a majority of the articles being discussed. Therefore, participants should schedule the rotation during a period when they have the time to devote to preparation for each session. Time periods with heavy clinical or administrative activities do not provide the time to maximize the benefit of each meeting.

Rotation Coordinators:
Thomas Jefferson University
Walter Kraft, MD
1170 Main, 132 S. 10th St, Philadelphia, PA
215 955 9077 walter.kraft@jefferson.edu

Annals of Internal Medicine
Christine Laine, MD, MPH
215 351.2527 claine@mail.acponline.org

Administrative Assistants:
Suzanne Flint
SFlint@mail.acponline.org

Robert Blackwell
rblackwell@acponline.org

Managing Editor
Mary Beth Schaeffer
mschaefferc@acponline.org

Rotation Goals:
Participants will:
- Observe and participate in the editorial process of a major medical journal
- Understand the accepted statistical standards for high quality clinical research
- Incorporate the critical assessment of research observed in the editorial process to their personal research projects

Duration:
4 weeks
Meeting Times:
Editorial Meetings: Every Thursday, 4-6 PM
Statistical Meetings: 3-4 PM, prior to each editorial meeting.

Location:
ACP
5th floor, 190 N. Independence Mall West, Philadelphia (at the corner of 6th and Race St, which is a 10 minute walk from the Jefferson Medical College Campus)

Prerequisites:
Participants should have completed GC 660, Statistical Methods of Data Analysis (or equivalent). Completion of track courses in Epidemiology (GC 655) or Clinical Trial design (GC 630) is helpful, but not required.

Reference Texts:
The following resources will be available for loan from the Division of Clinical Pharmacology:


Rotation Guidelines:
Editorial Process at the Annals
Articles submitted for publication in the Annals are first screened by one of three deputy editors. Articles felt to be candidates for publication are sent to outside reviewers for comments. Articles with the reviewer comments are distributed to the associate editors one week before meetings. The associate editors each have a specific area of expertise. An associate editor is asked by the deputy editors to serve as a primary reviewer for each manuscript presented to the group.

After discussion during the editorial meetings, the Editor meets with the deputy editors to decide the fate of each of the articles.

Following editorial review, some articles are also evaluated for statistical validity at a statistical meeting held Thursdays at 3 PM.

Scope of Participation
Participants are expected to read most of the articles prior to each meeting. Individuals with germane expertise can participate in the discussions of a manuscript. In addition, participants should use the reference texts to review topics discussed at the editorial meetings. Participants should provide a short written evaluation of the rotation during the feedback session with the course coordinator.

Annals format
Participants should read a few of the last issues of the Annals to get an idea of focus of the journal and familiarity with the following types of articles:
• Systematic reviews
• Policy positions
• Original articles
• Brief communications
• Updates
• Academia and Clinic

Scott Library has a subscription to the Annals. The Division of Clinical Pharmacology has back issues of the Annals available for use, as well as access to PDF files from the excellent web site www.annals.org.

Obtaining Manuscripts
Manuscripts are delivered by courier the week of the editorial meeting.

Securing Access to the ACP Building
All visitors to the ACP should bring a form of identification and will need to obtain a building pass. Prior to the orientation session with Dr. Laine, participants should confirm that the front desk has their name as an expected guest.

Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Suggested Activities</th>
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<tbody>
<tr>
<td>1</td>
<td>Orientation at ACP</td>
</tr>
<tr>
<td></td>
<td>• 2:30 PM- Meet with Dr. Laine; obtain temporary pass</td>
</tr>
<tr>
<td></td>
<td>• 3:00 PM- Attend statistical meeting</td>
</tr>
<tr>
<td></td>
<td>• 4-6 PM- Attend Editorial meeting</td>
</tr>
<tr>
<td></td>
<td>• 6-6:30 PM- Attend meeting with Editor and deputy editors</td>
</tr>
<tr>
<td>2</td>
<td>Editorial Meeting</td>
</tr>
<tr>
<td></td>
<td>• 4-6 PM- Attend Editorial meeting</td>
</tr>
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</tr>
<tr>
<td>3</td>
<td>Editorial Meeting</td>
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<tr>
<td></td>
<td>• Write editorial review of a manuscript prior to meeting</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>• 6-6:30 PM- Attend meeting with Editor and deputy editors</td>
</tr>
<tr>
<td>4</td>
<td>Final meeting and feedback</td>
</tr>
<tr>
<td></td>
<td>• Write editorial review of a manuscript prior to meeting</td>
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<tr>
<td></td>
<td>• 4-6 PM- Attend Editorial meeting</td>
</tr>
<tr>
<td></td>
<td>• 6-6:30 PM- Attend meeting with Editor and deputy editors and final feedback</td>
</tr>
<tr>
<td></td>
<td>• Provide feedback to Walter Kraft</td>
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</tbody>
</table>
Policy for MD/PhD Students in JCLS/SKMC Transition

The Jefferson MD/PhD program includes two major transition points between Sidney Kimmel Medical College and the Jefferson College of Life Sciences. The first occurs when students complete year SKMC2, including completion of Step 1, and take leave of absence from SKMC to pursue their four years of graduate study and associated research. The second occurs when students complete their thesis research and return to SKMC for JeffMD Phase 2.

Policy for return to SKMC 3:

- All MD/PhD students returning to the clinical curriculum must begin in JeffMD Phase 2 (clinical clerkships) in April of their returning year.
- As a result, MD/PhD students returning to medical school in April must complete their thesis defenses no later than six weeks prior to the start of Phase II (March 1st for an April 15th return date). This deadline will allow MD/PhD students sufficient time to complete and finalize all thesis revisions prior to their return to SKMC full-time. There are no exceptions to this requirement. If MD/PhD students are not able to complete their PhD work under this new deadline, they will be required to delay returning for an additional calendar year.
- During the final year of medical school (Phase 3 under JeffMD), students will have increased elective time. MD/PhD students may use some of this time to complete additional lab work, including follow-up experiments, paper revisions, or new paper submissions.

The structured re-immersion program will take place prior to the start of Phase 2.
Return to SKMC 3

To:  MD/PhD Program (910 BLSB)

Name: ________________________________

PhD Program: ________________________________

I plan to return to SKMC for JeffMD Phase 2 in April. I understand that in order to do so I must:

- Complete my thesis defense and all associated requirements, including thesis revisions, no later than six weeks prior to the start of Phase II of the academic year in which I wish to return (March 1st for an April 15th return date)

- Participate in the mandatory structured clinical re-immersion program provided by SKMC prior to Phase 2

I request an additional year to complete my PhD studies. Please explain reason(s) for extension here.

___________________________________________  __________________
Signature of Student                                      Date

___________________________________________  __________________
Signature of Research Advisor                              Date

Printed Name of Research Advisor