Handbook for M.D.-Ph.D. Students
Medical Scientist Training Program (MSTP)
at Mayo Clinic, Minnesota Campus
2021-2022

Lisa Schimmenti, M.D., Program Co-Director
Scott Kaufmann, M.D., Ph.D., Program Co-Director
Bruce Horazdovsky, Ph.D. Associate Director of Student Affairs
Arthur Beyder, M.D., Ph.D., Assistant Director, Academic Affairs
John Weroha, M.D., Ph.D., Assistant Director, Faculty Affairs
Ann Moyer, M.D., Ph.D., Assistant Director, Student Affairs

Karen Nation, Administrator
Lisa Hurley, Program Manager
Jerrie Hayes, Program Coordinator
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A brief history of the Mayo Clinic Medical Scientist Training Program

Research and graduate education at Mayo Clinic date back to 1915 when Drs. William and Charles Mayo used the bulk of their life savings, $1.5 million or $40 million in 2021 dollars, to endow the Mayo Foundation for Education and Research. This selfless act initiated an educational program that provided Ph.D. training in biomedical sciences and led to the first awarded Ph.D. degree in Biochemistry in 1917.

Mayo Clinic School of Medicine (MCSOM) opened in 1972 and granted its first M.D. degrees in 1977. In 1983, Mayo Foundation became an independent degree-granting institution accredited by the North Central Association of Colleges and Schools Commission on Institutions of Higher Education. A reorganization within the Mayo Foundation in 1989 led to the creation of MCSOM and Mayo Clinic Graduate School of Biomedical Sciences (MCGSBS) as they currently exist under the umbrella of the Mayo Clinic College of Medicine and Science (MCCMS). In 2019 the name of the medical school was changed to the Mayo Clinic Alix School of Medicine (MCASOM) to honor the generosity of businessman and philanthropist, Jay Alix.

The Mayo Clinic M.D.-Ph.D. Program admitted its first students in 1982. Previous program directors have included David Clapham, M.D., Ph.D.; Moses Rodriguez, M.D.; Grazia Isaya, M.D., Ph.D.; and Kendall Lee, M.D., Ph.D. Each has left their indelible imprint on the Program. The Mayo Clinic Medical Scientist Training Program (MSTP) grant was first awarded by the National Institutes of Health, National Institute of General Medical Sciences (NIH-NIGMS) in 2003 and successfully renewed in 2008, 2013, and 2018. During the first eighteen years of support, our MSTP has continued to develop and mature.

Each year in Rochester, approximately 46 new medical students, 50 new Ph.D. students and 9 new M.D.-Ph.D. students are now admitted to MCCMS. Mayo Clinic commits resources to fully support tuition and stipend costs for all M.D.-Ph.D. and Ph.D. students. In the past 35 years, exceptionally strong Mayo Clinic support for education and research has allowed top students to be enrolled in the M.D.-Ph.D. program and a growing number of outstanding investigators recruited to the Program’s faculty. At Mayo Clinic, a uniquely strong integration between basic science and clinical and translational research has fostered the environment necessary to achieve our educational mission of training future leaders in biomedical research and academic medicine.

Mission, Philosophy, and Training

The mission of the Mayo Clinic M.D.-Ph.D. Program is to train talented and passionate students to become transformative clinician scientists. Our main objective is to prepare each trainee for an academic career in basic, translational, and/or clinical research, focused on studying fundamental questions and translating basic discoveries into medical advances. The Mayo Clinic MSTP philosophy is that the skills required for this type of academic career are best developed in a basic or translational research setting; however, the unique quality of the clinician scientist is the ability to integrate basic studies with translational and clinical research to ultimately advance the practice of medicine. Therefore, in addition to providing a strong education in medicine and intensive training in scientific inquiry, we strive to (i) train our students to seek medical implications in even the most basic scientific discoveries; (ii) foster our students’ innate curiosity so that they will be keen to take clinical questions back to the laboratory to look for new fundamental knowledge; and (iii) develop each student’s leadership and collaborative skills so that they will be prepared to bridge basic and clinical research efforts as they pave the way for innovative solutions to medical problems.
MCASOM provides training for physicians but only limited training in research methodology. MCGSBS provides graduate level training in one of eight Ph.D. tracks. The M.D.-Ph.D. Program provides unique activities (Weekly M.D.-Ph.D. Conferences, M.D.-Ph.D. Selectives, an Annual Retreat, M.D.-Ph.D. Clinical Re-entry Course) and career advising tailored to the training of physician-scientists. The M.D.-Ph.D. Program also welcomes and provides a home for MCGSBS students who come to graduate school after receiving an M.D. degree elsewhere.

The main strengths of the Mayo MSTP are:

- Outstanding trainees who are passionate about research and its relevance to human disease,
- An independent admissions process that focuses selection of students based on their prior research experiences, demonstrated resilience, and commitment to a long-term career centered on biomedical research.
- A recruitment and retention plan with the mission to enhance and support students who are diverse in a variety of ways, including race, ethnicity, gender, and ability.
- Programmatic features, including Weekly Conferences, Selectives, Annual Retreat, Clinical Experiences Program, Longitudinal Clinical Experiences, and Clinical Re-Entry Course, that address the specific needs of M.D.-Ph.D. trainees.
- A training faculty that currently consists of 96 faculty members but is increasing as students and others identify additional faculty who would meet criteria for becoming mentors.
- A commitment to increase the diversity of our faculty. At present, the training faculty is comprised of 68 professors, 20 associate professors and 8 assistant professors. One third of the mentors identify as women and 11% are from groups under-represented in medicine and science (UIM). We acknowledge that, while the diversity of our faculty is above the national average, we need to further increase its diversity. In particular, we are committed to increasing the number of women and other under-represented individuals on the training faculty.
- A requirement that our faculty complete mentor training using the Center for Improvement of Mentored Experiences Research (CIMER) model.
- Concurrent enrollment of Mayo Clinic MSTP trainees in both the graduate school and medical school throughout their training, which allows trainees to move seamlessly between each school to complete both graduate and medical school coursework.
- Funding of Mayo Clinic MSTP trainees throughout their training by this Program and not by individual research mentors. This funding model, which is made possible by our MSTP grant, individual F awards, and institutional funds, including an endowment, provides MSTP students flexibility in mentor choice and mentors the ability to take on a student while using their research funding to perform research.
- A scientific environment that that emphasizes scientific rigor and reproducibility within the framework of responsible conduct of research as a core value and recurring theme throughout training.
• Competency-based curricula in both the medical school and graduate school.

• A supportive environment for learning grant writing. Building on the M.D.-Ph.D. Selective on Grant Writing, each M.D.-Ph.D. trainee is coached through the process of submitting an F30, F31, or equivalent grant. The success rate for M.D.-Ph.D. trainees has been 58% over the last ten years.

• A supportive environment for learning how to publish research findings. All trainees are expected to publish a first-author research manuscript prior to defending their Ph.D. theses. On average, our trainees publish 4 first author papers.

• MSTP leadership that ensures all trainees move through the program with an appropriate time to degree, being mindful that individual student needs take precedence over time to degree.

• Flexibility to complete M3 before graduate training or have the option to complete clinical rotations during graduate training with mentor approval.

• Annual one-on-one meetings to discuss Individualized Development Plans (IDPs) created by each student throughout the Program with the support of the co-Directors, Associate Director and Assistant Directors. These annual meetings, like the evolving IDP documents, are specific for each stage of training and include discussions of laboratory selection during M1/M2; progress toward degree, course selection, and academic achievement during the graduate phase; re-entry to M3 and residency selection/career guidance during M4.

• Dedicated physician-scientists as Co-Directors, Drs. Lisa Schimmenti and Scott Kaufmann, with a combined 30 years of experience in MSTP training.

Diversity Statement

The Mayo Clinic MSTP is committed to providing a safe and supportive environment to all learners regardless of race, ethnicity, gender identification, and ability. Student concerns regarding behaviors or experiences that are disrespectful and not in alignment with Mayo Clinic values should be brought to the attention of program leadership. Concerns are treated confidentially and taken seriously.

Program Administration:

The MSTP program is co-led by Lisa Schimmenti, M.D. and Scott Kaufmann, M.D., Ph.D.

Lisa Schimmenti, M.D., Assistant Dean for M.D.-Ph.D. Affairs, joined the Program Committee of the University of Minnesota MSTP in 2010 and rose to Associate Director in 2013. She moved to Mayo Clinic in December 2015 and became the Associate Director for Academic Affairs of the Mayo Clinic MSTP in 2017. She has been committed to the career of a physician-scientist since her fellowship training at Yale in the laboratory of Joseph Madri M.D., Ph.D., where she was awarded an F32 and then transferred this grant to the University of Minnesota. Upon completion of her Genetics training at Minnesota, her first faculty position was at UCLA and she was awarded a K08. This was followed by an R01 focused on genetic testing in hearing loss that remained at UCLA when she returned to Minnesota in 2002. At Minnesota, her laboratory was supported by a March of Dimes grant followed by a second R01. During her
time at Minnesota, she designed and co-directed a new curriculum in Genetics and Biochemistry and was awarded the University's highest teaching honor. She was recruited to Mayo Clinic in 2015 to develop a program in hearing genetics in the Department of Otorhinolaryngology and was appointed the Chair of the Department of Clinical Genomics in 2018, serving until 2020 when she successfully competed in an open search and was appointed co-Director of the MSTP program to succeed Kendall Lee, M.D., Ph.D.

In addition to her active clinical practice with a focus on rare and undiagnosed diseases associated with vision and hearing loss, Dr. Schimmenti remains engaged in research and education. She teaches in Case Studies in Precision Medicine, a course designed to teach bioinformatics and genomic case solving for rare and undiagnosed disease. Dr. Schimmenti has trained two Ph.D. trainees, four post-doctoral fellows, two IMSD trainees and has served on 16 Ph.D. Thesis Advisory committees. During her time as the Associate Director of the Mayo Clinic MSTP, she implemented many innovations, including flexibility in the transition between M3 clinical rotations and graduate school, flexible time of return to M3 after graduate training, the longitudinal clinical experiences, and the development of MSTP student leadership roles. She participates in the AAMC Great Group.

Scott Kaufmann, M.D., Ph.D. joined the M.D.-Ph.D. Program Committee in 1996 and became Associate Director in 2003. Earlier in his career, Dr. Kaufmann completed training in the Johns Hopkins MSTP. After a residency in Internal Medicine and fellowship in Medical Oncology, he rose to the rank of Associate Professor of Pharmacology and Oncology at Hopkins before relocating to Mayo Clinic in 1994.

His laboratory has, since its founding, investigated the biochemical basis for anticancer drug-induced apoptosis and the impact of various cellular alterations on drug resistance. Building on his earlier observations that anticancer drugs induce activation of a class of proteases now known as caspases in susceptible cells, Dr. Kaufmann’s current work focuses extensively on the regulation of anticancer drug-induced apoptosis. He serves as principal investigator (PI) of grants from the NIH (R01 CA225996, R01 CA248064, P50 CA136393) and several foundations. He has previously served on the Experimental Therapeutics-2 and Developmental Therapeutics Study Sections of the NIH; and stepped down as senior editor of one of the American Association for Cancer Research journals (Molecular Cancer Research) in 2006 specifically to devote more time to the Mayo Clinic MSTP. Dr. Kaufmann teaches both medical and graduate trainees. He takes the lead in teaching the pharmacology of anticancer drugs to first-year medical trainees (in their Pharmacology course) and second-year medical trainees (in their Hematology course) as well as serving as course director for two literature-based Molecular Pharmacology courses. Since establishing his own laboratory, he has mentored 16 graduate trainees (including 6 M.D.-Ph.D. trainees) and 27 postdoctoral fellows, the vast majority of whom have positions in academia or the pharmaceutical industry. Since joining the Mayo Clinic, Dr. Kaufmann has also served on over 70 thesis advisory committees.

Both Dr. Schimmenti and Dr. Kaufmann have completed mentor training, have a strong commitment to training the next generation of clinician scientists, and have a record of using rigorous and transparent methods in experimental design, data collection, analysis, and reporting. They are colleagues and good friends who work together for the good of the program and the trainees.

Associate Program Director

Bruce Horazdovsky, Ph.D., is the MSTP Associate Director for Student Affairs and the Associate Dean of Student Affairs for the Mayo Clinic Graduate School of Biomedical Sciences. Dr. Horazdovsky focuses on student success during the graduate school years and is the point person for grant preparation. In addition, he has a long-term commitment to diversity and inclusion and has served as a liaison for the M.D.-Ph.D. program to pipeline programs, specifically the Summer Undergraduate Research Program, and has been responsible for outreach to colleges and universities serving under-represented students.
Assistant Program Directors

S. John Weroha, M.D., Ph.D., Associate Professor of Oncology (left), is the MSTP Assistant Director of Faculty Affairs and a physician-scientist whose research focuses on ovarian cancer. He leads a two-week clinical boot camp for trainees who would like intensive re-entry training at the end of the graduate phase.

Arthur Beyder, M.D., Ph.D., Associate Professor of Internal Medicine and Physiology (right), is the MSTP Assistant Director of Academic Affairs. His research focuses on basic mechanisms of sensory processing in the gut with translational implications in functional GI diseases, like IBS. Two M.D.-Ph.D. students are training in his laboratory. He co-directs the longitudinal clinical experiences and sits on the MCASOM Curriculum Committee where he helps oversee curriculum changes.

Ann Moyer, M.D., Ph.D., an alumnus of this program and Associate Professor of Pathology (left), is MSTP Assistant Director of Student Affairs and works closely with MCGSBS Associate Dean Bruce Horazdovsky. Her research focuses on molecular pathology and individualized medicine.

Program Administrative Staff

Karen Nation, M.B.A., H.C.M., is the Program Administrator for the Mayo Clinic Graduate School of Biomedical Sciences (right), has dedicated time specifically for the M.D.-Ph.D. program. Ms. Nation is responsible for financial and administrative oversight of the program.

Lisa Hurley, M.S., Program Manager (left), has provided oversight of this program for 20 years. Ms. Hurley is the face of the program for applicants and trainees. She is responsible for coordinating application review and interview days as well as M.D.-Ph.D. student onboarding, roles that help build rapport with each class of students. In addition to organizing the meetings of various committees and communicating with program faculty, Ms. Hurley documents completion of educational and research activities by the trainees, meets weekly with the Co-Directors to discuss administrative and student issues, maintains student data, and works with the M.D.-Ph.D. program co-Directors to complete T32 documentation and RPPR documents.

Jerrie Hayes, J.D., Program Coordinator (right), organizes and documents student participation in the weekly M.D.-Ph.D. Conferences. She organizes the Annual Retreat and supports admissions, recruitment, and diversity efforts. Her primary role is in Graduate Education leadership on the Arizona campus and has been instrumental in spearheading growth of the M.D.-Ph.D. program on the Florida Campus.
Overview of the M.D.-Ph.D. Course of Study

The Mayo Clinic MSTP is designed to provide an efficient path to the dual degree. Over the last ten years, students have completed both degrees in an average of 8.18 years. Over the last five years, the time to degree has dropped to 7.9 years.

Pre-clinical/Pre-thesis Phase (M1-2)

Year 1:
- Students begin the program in mid-June of the year of matriculation. On the first day of the program, students attend M.D.-Ph.D. orientation, where they register and meet with program leaders. Students begin their first laboratory rotation.
- Students participate in Ph.D. orientation during the second week of the program.
- The Annual M.D.-Ph.D. retreat is the highlight of the year. This occurs during the third week of June and is off campus every other year. The program includes an introductory skit by the new first year students, research presentations by graduate phase students, poster sessions, and program discussion. A barbecue social is a standard part of the program. This year marked the beginning of a new tradition, the Paper Plate Awards and Recognition for students midway through the program.
- Medical school begins the first week of July with orientation followed by the first block of classes. Students take Core 6000, Responsible Conduct of Research, and have the option to test out of Genome Biology and Chemical Principles of Biological Systems. If a student does not test out, these classes can be taken during the graduate school phase.
- Students have individual meetings with Dr. Schimmenti or Dr. Kaufmann in August or September to develop and discuss their Individualized Development Plan (IDP). Trainees complete their NIH Biosketch in preparation for the meeting with 2-3 goals for the next year appended to end of the biosketch.
- The Weekly M.D.-Ph.D. Conference runs August through June. All students in the program are expected to attend these weekly Friday noon conferences. Three different activities occur during different weeks. The first is the Journal Club, where students in the graduate years review important papers of interest to them that they believe will be of interest to the group. In addition to presenting the paper, the presenter starts with a brief “Works in Progress” to introduce themselves and ends with i) an assessment of why the presented paper is important and ii) a discussion of whether the research was rigorous. The second is the Clinical Pathologic Correlation (CPC) in which two students each present a case or clinical topic and pose questions to engage the audience. The third are career development sessions on topics that include how to choose a mentor, transition to medical school, choosing a residency, women in medicine and science, and careers in industry and entrepreneurship. Students in the graduate phase receive credit for attendance, but students in all years are expected to attend unless there are conflicts with medical school classes or clinical responsibilities.
- MSTP Selectives: During MS1 and MS2 years, students are required to take the two M.D.-Ph.D. selectives. In odd number years Dr. Kaufmann teaches a critical reading course that focuses on understanding the literature and evaluating research rigor. In even years, Dr. Schimmenti teaches a grant writing course focused on the strategy and preparation of an F30, F31 or foundation grant application.
Year 2:
- Summer of Year 2: Retreat and second meeting with Directors.
- Summer before Year 2: Complete second laboratory rotation if medical school schedule permits.
- August – June: Attend Friday noon conferences.
- Fall, Spring, Winter of Year 2: Complete 2nd Year M.D. Curriculum.
- Fall of Year 2: Decide whether to enter M3 or graduate phase at completion of Year 2. If planning on M3, meet with medical school advisors (Dr. Torgerson or Dr. Wolanskyj-Spinner) to plan third-year rotations based on possible considerations for residency.
- Spring of Year 2: Complete Pre-clinical block
- Spring of Year 2: Complete USMLE Step 1

Thesis Research Phase (G)

Year 3: First Year of the Graduate Phase
- Complete additional laboratory rotations and enter chosen thesis laboratory.
- Schedule third annual meeting with Directors, update IDP with goals for the coming year.
- Once a laboratory is chosen, choose from one of eight graduate programs. However, track selection must be made prior to mentor selection for processing. The graduate program does not need to be the same as the graduate program of the mentor: [https://college.mayo.edu/academics/biomedical-research-training/phd-program/tracks/](https://college.mayo.edu/academics/biomedical-research-training/phd-program/tracks/)
- Descriptions of required coursework and coursework waived for M.D.-Ph.D. students, is found at: [https://college.mayo.edu/media/mccms/content-assets/academics/biomedical-research-training/phd-program/Catalog2021-2022MCGSBSPhD-MSDegrees_rev-6-15-2021.pdf](https://college.mayo.edu/media/mccms/content-assets/academics/biomedical-research-training/phd-program/Catalog2021-2022MCGSBSPhD-MSDegrees_rev-6-15-2021.pdf)
- Immerse yourself in research, work closely with your mentor, collaborators, and laboratory team.
- Give a presentation at M.D.-Ph.D. journal club.
- Work with your mentor to identify members of your pre-Thesis Advisory Committee (pre-TAC) within 90 days of mentor selection. Meet every 6 months or more frequently if needed. A member of the M.D.-Ph.D. leadership is required to be on the committee.
- Consider an MSTP leadership role such as Student Admissions Representative or Student Advisory Committee President/Vice President.
- Have fun.
Year 4: Second Year of the Graduate Phase
- Update IDP with new goals for the year and schedule annual meeting with Directors for the summer or early fall.

- Plan for the written qualifying examination before 18 months have elapsed. Plan for the oral examination shortly after.

- Meet with Dr. Horazdovskv to discuss your required F30, F31, or foundation grant application and set a submission date. Note that F30 grants must be submitted before your 48th month in the Program.

- Take the Longitudinal Clinical Experience Course (optional but good).

Year 5 and Year 6: Third and Fourth Year of the Graduate Phase
- Have even more fun.

- Complete thesis research, plan on defense. [http://intranet.mayo.edu/charlie/mayo-clinic-graduate-school-biomedical-sciences/students/forms/ph-d-forms/](http://intranet.mayo.edu/charlie/mayo-clinic-graduate-school-biomedical-sciences/students/forms/ph-d-forms/)

- Work with your mentor to submit manuscripts for publication.

- If you have not completed M3, meet with the medical school advising deans to plan M3 in October or November of the academic year in which you plan to defend.

- Take the Longitudinal Clinical Experience

- Consider doing a clinical rotation or two if time permits.

- Consider an MSTP leadership role such as Student Admissions Representative of Student Advisory Committee President/Vice President.

- Defend your Ph.D. thesis when you have completed a sufficient body of work based on the assessment of your mentor and TAC. An accepted first-author publication (or waiver) is required prior to defense.

- Students typically finish the graduate phase in a range of 3-5 years with 4.2 being the median.

Clinical Phase (M3-M4)

Year 6 or 7: M3 if taken after graduate school with modifications if taken before graduate school
- Focus on success in clinical rotations.

- Formulate plans to enter the Match.

- Meet with Dr. Schimmenti or Kaufmann near the end of M3 to discuss Match plans and gather information on how to choose a program for long term success (can do this at prior to thesis defense if M3 taken before graduate phase).

- Meet with Dr. Wolanskyj-Spinner or Dr. Torgerson to fine tune matching strategies (can do this at prior to thesis defense if M3 taken before grad phase).

- Prepare and take USMLE Step 2.
Year 7 or 8:
- Complete key rotations needed to enter the Match
- Obtain strong positive letters that support your desired medical specialty and long-term career goals.
- Enter the Match, interview, submit Match choices (mid-February).
- Complete M4 electives.
- Consider taking the 16-week post-Ph.D. research elective with your Ph.D. mentor, a new mentor, or to explore a clinical topic of interest.
- Keep Drs. Schimmenti and Kaufmann informed of your progress and Match process. We are here to help with strategy, making needed connections, and discuss what to look for in a great program that meets the needs of physician-scientist trainees. Special strategies for surgeon scientists and non-traditional M.D.-Ph.D. careers are a strength of our program. We will support you in your goals.
- Match! Graduate. Breathe…. 

Overview:

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<th>Jun</th>
<th>Jul</th>
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<th>Sep</th>
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<tr>
<td>1</td>
<td>Orientation Lab Rotation #1 Retreat</td>
<td>Core 6000 RCR</td>
<td>MCASOM Year 1 Curriculum</td>
<td>Anatomy, Biochemistry, Genetics, Histology, Microbiology, Pharmacology, Senior Sages (Geriatrics), Basic Doctoring, Selectives*</td>
<td>MSTP Selective**</td>
<td>Continue M1 Curriculum and Ongoing M.D.-Ph.D. Activities***</td>
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<td>Core 6150 Gen Biology</td>
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<td>2</td>
<td>Lab Rotation #2 Retreat</td>
<td>MCASOM Year 2 Curriculum</td>
<td>Circulation, Respiratory, Hematology, Renal, Gynecology, Urinary Trac, Endocrine, Nutrition &amp; Digestion, Selectives*</td>
<td>MSTP Selective**</td>
<td>Preclinical Block</td>
<td>USMLE Review / Step 1</td>
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<td>3</td>
<td>Lab Rotation #3 (optional) Retreat</td>
<td>MCGSBS Coursework</td>
<td>(Core courses and track specialization courses). Comprehensive written qualifying exam at end of year G1. Thesis research; apply for extramural funding.</td>
<td>MCASOM Year 3 Curriculum (if complete M3 prior to start of G phase)</td>
<td>Ongoing M.D.-Ph.D. Activities***</td>
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<td>5&amp;6</td>
<td>Retreat</td>
<td>MCGSBS: Thesis research, preparation, and defense. Ongoing M.D.-Ph.D. Activities***</td>
<td>Re-entry course</td>
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<td>7</td>
<td>Retreat</td>
<td>MCASOM Year 3 Curriculum: Required clerkships: Family Medicine, Internal Medicine, Neurology, Obstetrics/Gynecology, Pediatrics, Psychiatry, Surgery, Didactics: Evidence-Based Medicine, Intercession</td>
<td>Ongoing M.D.-Ph.D. Activities***</td>
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<td>8</td>
<td>Retreat</td>
<td>MCASOM Year 4 Curriculum: Required clerkships: Emergency Medicine, Medicine Sub-internship Other: Clinical Electives, Residency Boot Camp, Didactic Intercession, Residency Interviews, USMLE Step 2 by Dec 1</td>
<td>Ongoing M.D.-Ph.D. Activities***</td>
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*Selectives: Dedicated 1- tp 2-week blocks during M1 and M2 that enable students to experience a self-directed approach behind the design of the medical curriculum, emphasizing personal responsibility for the learning experience.

**MSTP Selective: Grant Writing Selective or Critical Reading Skills (offered alternating years)

***Ongoing M.D.-Ph.D. Activities: Weekly M.D.-Ph.D. Conference; M1 and M2 student meetings with Ph.D. track directors and prospective mentors (Pizza Lunches). Regular meeting with co-directors for discussion of lab selection, transition points, mentoring, residency selection.
All Phases: Required Activities

- Attendance at M.D.-Ph.D. Weekly Conference is a requirement for students in all phases of the program.

- An annual meeting with the Directors to discuss your program, review your goals and examine your IDP occurs every year of the program, even the last year.

- The Annual Retreat is required for all students except for M3 and M4 students with clinical responsibilities that will not permit an absence.

Advising Philosophy

The Advising philosophy of the Mayo M.D.-Ph.D. program is to nurture students to pursue their dreams and fulfill their promise to become a physician-scientist. Students are not steered into specific career paths but are instead offered several options for a successful career. The role of M.D.-Ph.D. leadership in advising is to offer lessons learned from over thirty years combined experience and help students develop positive strategies for long-term success.

Advising Overview

Advising for M.D.-Ph.D. students takes several forms and includes a diverse cadre of individuals invested in the success and future of the students.

Annual meetings and discussion of Individualized Development Plan

Every summer and fall trainees are invited to schedule a 30-60-minute, one-on-one meeting with Dr. Schimmenti or Kaufmann along with one of the Assistant Directors. To prepare for this meeting, trainees prepare (update) an NIH biosketch using the most recent forms. Forms can be found here: https://grants.nih.gov/grants/forms/biosketch.htm

Exemplar biosketches will be shared with early phase students with permission of current later phase students. This biosketch will be with you for the rest of your career. Like tending a garden, the biosketch will grow and change every year along with your development and experience.

At the end of each biosketch, students should state their goals for the next year. Keeping track of each year’s goals will help document progress.

Transition from M2 or M3 to Graduate Phase

Your relationship with your Ph.D. mentor is one of the most important relationships in your career. Accordingly, choosing a mentor is one of the most important decisions you will make. While you are making this decision, it has to potential to be one of the more stressful times during your training. Drs. Kaufmann and Schimmenti are here to serve as sounding boards and provide information that can be helpful in making this important choice. There is no right way to pick a mentor, but there are several considerations to help ensure a successful productive relationship.

- Has your potential mentor successfully guided other Ph.D. or M.D.-Ph.D. students to degree?
- Is your mentor aware of and willing to work with the requirements of the M.D.-Ph.D. program?
• Does your mentor have external funding or poised for external funding?
• Has your mentor completed required mentor training? In reading papers from your potential mentor’s lab, do you like the research and feel comfortable about the rigor of the research? Are there important questions being asked by the laboratory?
• Is there a project that you can conduct and ultimately drive with increasing levels of independence?
• Do you have sufficient rapport with your mentor that you think he or she will be there to help you pick a new thesis project if your initial thesis project fails?
• Is the lab a happy place?
• Does your mentor have time to devote to your training?

Thesis Advisory Committee (TAC)

Each track has some differences in the composition of the TAC, but there are common themes. Most tracks ask for five independent members of your committee. One of the five may be an external examiner from another accredited university or research institute from anywhere in the world. Three of the members must have full graduate and examining privileges in one of the graduate tracks, with at least two (and in some cases more) from your chosen graduate track. One member must be a member of the M.D.-Ph.D. leadership (Drs. Schimmenti, Kaufmann, Horazdovsky, Moyer, Beyder, Fryer (M.D.-Ph.D. Director, Mayo Arizona) or Weroha). TAC members can be on any of the three Mayo Campuses. As you are putting your TAC together, work closely with your mentor and with Drs. Kaufmann and Schimmenti. You must see that your TAC meets at least twice a year and meetings are documented. Your TAC will be helpful in setting goals, serving as a resource, and resolving conflicts, if they should arise.

Publication Requirement

All M.D.-Ph.D. and Ph.D. students, regardless of track, are required to publish at least one first-author paper from their thesis research. This takes the form of an original piece of research. Structured reviews, purely descriptive clinical papers, or case reports do not count toward this graduate requirement.

If you have been funded by the MSTP T32 grant during any part of your training, please put the grant number in the acknowledgements or funding of your paper. This is very important for sustaining grant funding for our program and helpful to draw attention to your success at the NIH.

Grant Application Requirement

Every student in the M.D.-Ph.D. Program is required to go through the process of applying for grant funding. While the success rate for the entire program over the last decade is 58%, it is not expected that everyone will be funded on the first or second round. The process is more important than the outcome. It is also important to know that many things that go into an F award that are beyond a trainee’s control, so the outcome of this submission is not a judge of any student’s ability to succeed in the future.

For students who are not F award eligible because of citizenship, foundation grants that focus on a specific disease area are equal in merit. Examples include the American Heart Association, Ford Foundation, Soros Foundation, and Fulbright Fellowships.
Transition from Graduate Phase back to Clinical Phase

A series of innovations have been put into place to help ease the transition from graduate school back to the last two years of medical school. These include:

- Flexible return to medical school after graduate school. Up until three years ago, a July return was the only option.
- Longitudinal Clinical Experience during the graduate phase.
- New and improved re-entry program designed and implemented by Dr. John Weroha.
- Opportunity to take M3 rotations prior and during the graduate phase.
- Opportunity to take the entirety of M3 prior to entering the graduate phase.

These experiences will take some of the anxiety of returning to M3 and M4 and direct it toward student success. We hypothesize that these experiences will increase student satisfaction and reduce time to degree. We are in the process of collecting data to assess the validity of these hypotheses.

Meet with Dr. Schimmenti to discuss plans and strategies to optimize their third-year schedule based on match choices. Student should also meet with the Dean of Student Affairs of the Medical School for advice and support as well.

Match

Pre-Match: Meet with Dr. Wolanskyj-Spinner and Dr. Torgerson to discuss match goals and strategy. Meet with Dr. Schimmenti to discuss programs would meet the needs of a physician-scientist trainee.

Obtain letters for the match during clinical rotations, ideally close to the rotation, rather than waiting for the summer before the match. Letter writers will have a fresher memory of your performance.

Apply for residency at the earliest possible time point. Interviews are given out on a rolling basis. Late applications may not be granted interviews, or fewer interviews as a result. Use your application to focus on your unique position as a clinician scientist.

Graduation

Unlike other programs, Mayo Clinic grants the M.D. and the Ph.D. degrees at the same time upon completion of the entire dual degree program. At graduation, graduates will be conferred the Ph.D. degree and the M.D. degree and will wear both hoods and tassels.

Alumni

Once you become a Mayo Clinic M.D.-Ph.D. alum, you are part of the family for the rest of your life. Alumni are an important part of the program and have been important for connecting the next generation of clinician scientists to the greater community of clinician scientists. Please stay in touch; let us know where you are and what you are doing. Your success is our success. Alumni may be asked to respond to surveys that help our program improve. In addition, we are open to your ideas and suggestions at any time as you gain life experience.