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2020-2021 MD-PhD Handbook



University of Florida MD-PhD Training Program
University of Florida College of Medicine

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TABLE OF CONTENTS

BACKGROUND, MISSION, AND CONCEPTUAL FRAMEWORK OF UF MD-PhD Program	4
Background of MD-PhD Training at the University of Florida.....	4
Mission Statement of MD-PhD Program.....	5
Conceptual Framework	5
PROGRAM ORGANIZATION AND CURRICULUM.....	6
Overview of Curriculum and Timeline.....	6
Orientation (Prior to MS1).....	8
Programs Attended by All Scholars.....	8
Didactic Components.....	9
Mentored Research Experience.....	13
Clinical Training during MD-PhD Program.....	15
Transitions Program.....	17
PROGRAM GOVERNANCE, PERSONNEL AND ADMINISTRATION.....	19
Administration	19
Directorate.....	20
Committees.....	23
Scholar Participation in Program Planning and Operation.....	23
CAREER DEVELOPMENT OPPORTUNITIES	12
UF MD-PhD Leadership Curriculum.....	12
Professional Skill Building Workshops.....	12
Career Interest Seminars	12
Grant Writing Coursework and Grant Preparation/Submission.....	12
Opportunities for Teaching and Mentoring	13
Elective Activities.....	13
PRECEPTORS/MENTORS.....	23
Finding Research Mentors at UF.....	23
Pairing with a Research Mentor for PhD Dissertation.....	24
Clinical Mentors.....	24
Semiannual Review of Individual Development Plans	24
SCHOLAR APPLICATION, ADMISSION, AND MATRICULATION	25
MD-PhD Class and Program Size	25
Commitment and Efforts to Ensure Diversity and Inclusion.....	27

Participation of MD-PhD Scholars in the Admissions Process	27
Scholar Review and Selection.....	27
Readmission Policy.....	28
Admission to UF MD-PhD after MS1-2 Years of Medical School	29
SCHOLAR SOCIAL SUPPORT.....	28
The UF MD-PhD Community.....	26
Monthly Evening Meetings with Program Leadership.....	27
Scholar Council.....	27
Wellness Committee.....	27
GRADUATE STUDENT LOUNGE	30
COUNSELING AND STUDENT HEALTH SERVICES	30
FINANCIAL ISSUES	30
Stipends and Tuition	30
Health Insurance.....	31
Fees, Taxation of Stipends/Tuition.....	31
Travel Funds.....	32
ACADEMIC PROFESSIONALISM AND INTEGRITY	32
Research Integrity.....	32
UF Research Misconduct Policy	32
Student Honor Code	33
MD-PHD PROGRAM EVALUATION AND DATA COLLECTION.....	33
Trainee-level Assessment Plan.....	34
Programmatic Support and Structure Evaluation Plan.....	34
Program Environment and Culture Evaluation	34
Training Outcomes of Scholars since 2007	35
APPENDIX: RESOURCES FOR MD-PHD SCHOLARS.....	33
UF Directorate Contact Information.....	36
UF CTSI Facilities and other Resources.....	34
Learn, Discover, Lead Syllabus for 24 Month Cycle of Professional Skill Building Workshops	36
Individual Development Plan Template	36

BACKGROUND, MISSION, AND CONCEPTUAL FRAMEWORK OF THE UF MD-PHD

Background of MD-PhD Training at the University of Florida Health Science Center

Prior to 1986, there was no formal MD-PhD Program at the University of Florida (UF). The program initially consisted of an accommodation of MD students who wanted to pursue PhD training. The Program remained small (14-27 students per 8 years) with no stipend or tuition support other than a forgivable loan program until 2007, when new College of Medicine leadership made a commitment to the funding of tuition and stipends. The Scholars matriculating in years 2007 to the present are comparable to other MD-PhD Programs, matriculating 4-6 Scholars per year with graduates of 2-5 per year. Thomas A. Pearson, MD, MPH, PhD assumed Directorship of the UF MD-PhD Program in 2018. Since then, increased resources have been committed, new leadership and faculty recruited, and several new programs implemented.

The UF College of Medicine (UF COM) has one of the strongest medical education programs in North America. Its mission is to improve health care in Florida, our nation and the world through excellence and leadership in education, clinical care, discovery and service. 2016 was the 60th anniversary of the founding of the UF COM. The UF COM is ranked 16th among US public medical schools and 41st among nation's top research medical schools, according to U.S. News & World Report. This is the highest ranking in the 60- year history of the COM. The COM includes 28 research-oriented basic and clinical academic departments, almost 900 students, over 700 residents and fellows, and more than 1,200 faculty members.

College of Medicine faculty are national leaders in fundamental, translational and clinical research in areas pertaining to diseases of the nervous system, human aging, cancer, diabetes, infectious disease, immunology and inflammation, genetics and gene therapy, and muscle biology. Our faculty and collaborative research teams continue to receive awards and honors that reflect their exceptional distinctions and contributions. Our researchers have achieved an increase in National Institutes of Health funding reflected in the impressive rise in national rankings from 62nd to 42nd in 2019 (joining the upper third of United States medical schools), according to U.S. News & World Report. The College of Medicine houses 8 affiliated research institutes and 23 affiliated research centers. Two of the most widely recognized products to come out of research at the College of Medicine are Gatorade®, a popular sports beverage, and Trusopt®, an eye drop developed to treat certain forms of glaucoma.

Current Research Environment at UF Health Sciences Campus (HSC) The UF HSC is the largest and most comprehensive Academic Health Center in Florida and one of the largest in the Southeast U.S. UF HSC is one of only three U.S. universities with all six Health Science Colleges (Dentistry, Medicine, Nursing, Pharmacy, Public Health, and Veterinary Medicine) as well as university and VA teaching hospitals and the parent university on the same campus within a few minutes' walk of each other. UF is currently ranked #7 among public universities by the USNWR. The UF HSC shares a 2,000-acre campus with Colleges of Liberal Arts and Sciences, Engineering, and Agriculture Two PhD programs collaborating with the UF MD-PhD Program [Biomedical Engineering and Anthropology] are based in these colleges.

The UF HSC has eight Institutes which feature intercollege, multidisciplinary research and research training programs (Cancer Center, Clinical Translational Science Institute, Diabetes Institute, Emerging Pathogens Institute, Genetics and Genomics Institute, Institute on Aging, Institute for Child Health Policy, McKnight Brain Institute). Many MD-PhD Scholars will be affiliated with and receive PhD support from one or more of these Institutes. The UF HSC is constantly expanding its research infrastructure. For example, a Data Science Institute is rapidly developing with State of Florida financial support as a joint venture with the College of Engineering, with a new Data Science Building currently under construction to house faculty from UF HSC and the College of Engineering. The Health Science Center has approximately 55% of the expenditures for research for UF in fiscal 2018, (\$290M external research funding of which \$202M is federal and \$147M is from NIH. The UF HSC in fiscal 2018 had 659 investigators receiving federal funds.

Mission

The University of Florida MD-PhD Training Program will recruit, rigorously train, and promote the retention of diverse physician-scientists for impactful roles in careers which integrate science and clinical medicine. The current MD-PhD program was established in its present form in 2007. The proposed program plan expands and integrates ongoing research training opportunities and develops new ones at the University of Florida Health Science Center (UFHSC). The UF MD-PhD Program is a collaborative effort between the UF College of Medicine and the UF Clinical and Translational Science Institute.

The Conceptual Framework for Development of the UF MD-PhD Program Mission

The development of the UF MD-PhD Program is based on eight core concepts and a “Community of Practice” educational model that will facilitate the achievement of its primary goal: the preparation and retention of physician-scientists in impactful careers in biomedical science (Figure 1). Core concepts include:

1. Clinical and Translational Science: The UF MD-PHD Program emphasizes discovery science and its application to address important issues in the prevention, diagnosis, and treatment of human disease. The integration of the Program with the UF Clinical and Translational Science Award (UF CTSA) Program makes available extensive facilities, personnel, and support for MD-PHD Scholars. The rigor and reproducibility of the discovery science and applied research is a major emphasis of the Program.
2. Breadth of training: The research doctorates that MD-PHD Scholars pursue will include a broad spectrum of disciplines, including basic biomedical, behavioral, community, population, and data sciences. The Colleges of the UF HSC, with additional PhD Programs in Biomedical Engineering and Anthropology, will provide interdisciplinary opportunities and support for training with high-quality mentors from 10 PhD Programs.
3. Integration of Clinical and Research Training: Each phase of MD-PhD training will include components of both research and clinical medicine with emphasis on integration of these elements throughout the Scholar’s education.
4. Transition between Phases of Training: UF MD-PhD Program leadership will provide assistance to the Scholars during the major transition periods between MD and PhD Programs, to assure retention in both MD and PhD Programs, and prepare Scholars for postgraduate medical training. This includes program-sponsored wellness activities designed to promote scholar wellness and retention through the student-run UF MD-PhD Wellness Committee.
5. Trainee Involvement: UF MD-PhD Program planning, implementation and evaluation should foster active participation and leadership by Scholars, including the opportunity to initiate programs of value to them. Specifically, the Scholar Counsel operates several elements of the programs, provides input and coordinates new or proposed initiatives, and occupies seats at Directorate meetings and functions.
6. Team Science: MD-PhD Scholar training will involve acquisition of knowledge, attitudes, and skills related to Team Science.
7. Career Preparation: UF MD-PhD Scholars should be prepared for a broad range of biomedical science career options. This does not exclusively consist of academic careers, but also private industry, entrepreneurship, government, and community engagement/advocacy. The primary goal is 100% of graduates with careers involved in biomedical science.

8. Evidence-based Educational Methods: The UF MD-PhD Program will rely on evidence-based educational methods and technologies wherever possible, and contribute evidence for new training approaches.

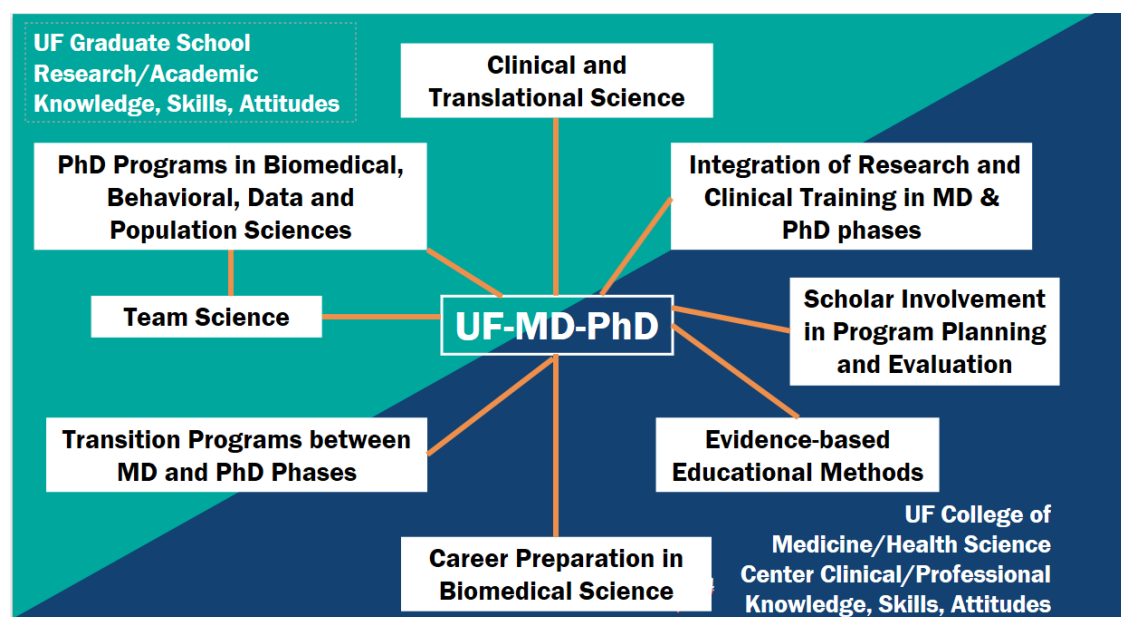


Figure 1. UF MD-PhD Training Program Conceptual Model

PROGRAM ORGANIZATION AND CURRICULUM

Overview of MD-PhD Curriculum and Timeline

Figure 2 provides a comprehensive overview of all didactic, clinical, research, organizational, experiential, and career development activities for each UF MD-PhD Scholar across the typical eight-year program. The Program Plan includes:

- the 21-month Medical School Preclinical Phase (MS1, MS2);
- the four (occasionally three or five) Graduate School years (GS1-GS4), and
- the two-year Medical School Clinical Phase (MS3, MS4).

The total length can vary from seven (for those who have had prior coursework or laboratory experience to allow completion of the PhD in three years) to nine (for those needing more time to complete the PhD thesis based on individual goals or breadth of studies).

Figure 2 identifies transitions between segments of MD-PhD training: basic science, didactic, graduate school didactic, graduate student mentored research, and clinical clerkships. Figure 2 also identifies:

- integrative activities (Practicum during MS1, MS2; Clinical Clerkship at end of MS2; Clinical Care experiences during GS1-4; and continued Research Manuscript presentation and publication in MS3 and 4);
- the timing of Career Development activities, including the Leadership Curriculum in four installments over GS1-4;
- training in Systematic Reviews in GS1;
- F30 grant writing and mock study section in GS1,2;
- career interest and professional skill building in GS1-4 workshops.

A UF MD-PhD Milestones checklist for each of the eight years of training is provided in the Appendix. This allows Scholars and Advisors to keep track of MD-PhD activities from year-to-year.

Medical School			Graduate School			Medical Scientist Training					
YR	Semester	Pre-clinical Didactic	Clinical	Didactic	Mentored Research	MD-PhD Meetings	Transitions	Career Development			
1	Summer	Orientation		IRB, HIPPA		Orientation ICTR	Practicum ↓	Leadership workshops and Research Leadership Workshop			
	Fall	Basic Science				Lab Visits, Dinners Retreat					
	Spring	Basic Science				Dinners Symposium					
2	Summer		Clinical Clerkship, STEP 1	IACUC	Lab rotations		MD-PhD Transitions				
	Fall			Clinical science		Dinners Retreat					
	Spring	Clinical Science			Dinners, Spring Symposium						
3	Summer			Rigor & Reproducibility	Entering Research		Clinic Exp (EAC) Clinical Mentoring ↓	Clinical Leadership Workshop			
	Fall			Seminars PhD Courses	Mentored Research ↓	Fall Retreat		Systematic Review Training			
	Spring			Seminars, PhD Courses, RCR		Spring Symposium		Grant Writing, GMS 6847			
4	Summer			Seminars, PhD Courses			Grant Writing Mock Study Section				
	Fall			Seminars PhD Courses		Fall Retreat	Educational Leadership Workshop				
	Spring			Seminars PhD Courses	Spring Symposium	Career Interest and Professional Skill Building					
5	Summer			Seminars	Presentations		↓	PhD→ MD Re-immersion	↓		
	Fall			↓	↓	Fall Retreat					
	Spring					Spring Symposium					
6	Summer								↓	Postgraduate Training Selection (PSTP) ↓	
	Fall					Fall Retreat					
	Spring					Spring Symposium					
7	Summer		Clinical Clerkship			Manuscript publication ↓	Dinners, Fall Retreat	Transition to Practice ↓			
	Fall						Dinners, Spring Symposium				
	Spring										
8	Summer		Clinical Clerkship	Graduation				Postgraduate Training	Graduation		
	Fall		Clinical Clerkship				Dinners, Fall Retreat				
	Spring		Interviews				Dinners				
			Preparation for internship				Contact for follow-up	Postgraduate Training			

Figure 2. UF MD-PhD Training in Medical School, Graduate School, and Medical Science

Orientation to UF MD-PhD (July, MS1)

The incoming UF MD-PhD Scholars arrive two weeks prior to the Medical Student Orientation in the second week of July. This orientation is standardly two weeks in length, with four parts:

- 1) Overview of the eight-year Program with milestones (See Appendix)
- 2) Participation in a summer course: Introduction to Clinical/Translational Research (ICTR)
- 3) Initiation of a Practicum in Patient-Oriented Research
- 4) Introduction to the Leadership Curriculum.

The first half day of the Orientation will provide a semester by semester description of the UF MD-PhD Program, including a review of the Logic Model guiding the program, Program Goals, all activities with a timeline for expected activities in Years 1-8, and long-term outcomes in Years 8-15. Students have requested this long-range view so they can plan for transitions more effectively.

A major activity of the Orientation is the course, GMS 7093: Introduction to Clinical and Translational Research, sponsored by the UF CTSA and directed by Ronald Shorr, MD, MPH. This course is convened from 2:00-5:00 PM daily for eleven days, featuring 2-4 didactic lectures per day on topics related to clinical and translational research, plus a one-hour small group activity, including development of a mock research protocol. For UF Scholars, this didactic course serves as an important introduction to issues addressed in the "Practicum in Patient Oriented Research". The morning provides time for presentations and group meetings related to the Practicum and the initial sessions for the Leadership Curriculum. An important aspect of the ICTR course is its inclusion of trainees from all over the UF HSC, including other graduate students, post-doctoral fellows, Career Development Awardees (K series), and faculty newly arriving at UF HSC. This provides Scholars the opportunity for early exposure to other biomedical scientists during the initial stage of their career. Scholars are encouraged to obtain Institutional Review Board and HIPAA certifications during this first summer of the Program.

Programs Attended by All Scholars

Monthly Meetings

Each month, the UF MD-PhD Directorate convenes a meeting of its members (MPIs, Coordinators, etc.) and all MD-PhD Scholars. Attendance is required. The meeting is scheduled during a weekday evening between 6-8pm and a light dinner is served. The agenda consists of information/communications of interest to Scholars, program reports by Committees including the Scholar Council, Program Planning Workshops, and Career/Professional Skill Development Sessions. The agenda is developed by the Directorate with input from the Scholar Council. An open session is available for Scholars' issues and concerns.

Fall Retreat

The planning of the Fall Retreat is the responsibility of the Scholar Council, usually delegated as a responsibility of the rising GS1 class. It is convened over a full day on a Saturday in the fall semester at a site on or near the UF campus. This retreat usually is limited to Scholars, Faculty, and Staff. Scholar attendance is required. The Directorate members and mentors also attend with additional participants by invitation. For example, members of the undergraduate American Physician Scientist Association Chapter at UF have been invited. The agenda usually includes social time for networking, a progress report toward MD-PHD objectives and milestones, and a session in which all Scholars GS2-GS4 plus MS3, MS4 present a poster describing their work, and a workshop which Scholar leadership finds of special interest and benefit. A modest budget is set aside.

Spring Symposium

The Scholar Council delegates the GS2 Scholars to organize the Spring Symposium as a celebration of MD PhD Research to which the UF HSC community is invited. It is held in the late spring after the April scientific meetings, at a venue in the UF HSC campus. The Symposium is centered on a distinguished scientist from an institution outside of UF who is identified and invited by UF MD-PhD Scholars as the Annual MD-PhD Symposium Speaker. The topic of the Symposium should reflect cutting edge science applied to medicine. The scholars also develop the speaker's itinerary, greet the speaker at the airport, transport him/her to a hotel, take the speaker to dinner, and introduce him/her at the Symposium. A poster session of Scholar research is held in

conjunction with the Lecture. The co-sponsoring of the Spring Symposium with the UF CTSI Annual Research Day may also occur as both have scientific formats and occur at the same time of the academic year.

Didactic Components

(a) Required MD Preclinical Phase Curriculum (MS1, 2)

The UF COM curriculum for MS1 and MS2 is based on a patient-oriented, systems-based approach with small group learning, simulation, communication, and clinical skill building fairly typical of U.S. Medical Schools and fulfilling the requirements for LCGME accreditation (2015). (See Figure 3 course schedules for MS1 and MS2). Instruction begins in August of MS1 and continues to April of MS2, with the ten weeks between MS1 and MS2 available for laboratory rotations. Scholars are expected to fulfill all requirements for satisfactory performance. The MS1 and MS2 years are graded with a “pass-fail” scheme. The USMLE Step 1 Examination is typically taken in the spring of year 2. A passing score for all courses and clerkships as well as USMLE Step 1, 2CK, and 2CS are requirements for medical school graduation.

(b) Deep-dive into Basic Science (DIBS)

There is consensus that physician-scientists require a firm understanding of basic biomedical science substantially different in depth and scope than that required of a physician providing only clinical care or an academician conducting only research. The next generation of physician-scientists will face greater economic pressures, decreased research funding, a changing research culture, and new academic-health care delivery system partnerships. To navigate and thrive in this dynamic environment requires a more comprehensive set of skills and expertise beyond what is learned in the medical curriculum or in each student’s identified areas of graduate study.

The DIBS Course is a Discovery Pathway track, held on Thursday afternoons for most weeks during the MS1 and MS2 preclinical curricula. There is an additional ten-week period in the summer for laboratory experiences, including the 2-3 laboratory rotations prior to selection of PhD mentors. The DIBS Program is currently being developed and implemented with the following learning objectives:

- Know current, cutting-edge mechanisms of diseases at molecular/genetic and psychosocial/epidemiological levels. The mechanisms studied will be aligned with the systems-based curriculum of the MS1 and 2 years.
- Understand the benefits and shortcomings of research technologies and methodologies that are commonly used to assess the presence and outcomes of disease mechanisms, such as cell sorting, CRISPR, artificial intelligence, machine learning, natural language processing, and implementation science.
- Appreciate the study designs in laboratory, animal, and human research studies, inclusive of those implemented at the T3/T4 clinical spectrum (i.e. pragmatic clinical trials, psychometric measurements & scale testing), which are employed to describe disease and test hypotheses with high rigor and reproducibility. The various biases that threaten study validity should be explored.
- Acquire skills to read and interpret the research literature, including the study’s hypotheses, design, analysis, and implementation and provide constructive criticism as to how the study might be improved. Such skills include developing statistical literacy and familiarity with qualitative methodologies.

DIBS will be offered in the Thursday afternoon time slots available in spring and fall semesters. The content of weekly discussions will be related to the materials presented in the MS1 and MS2 curricula for that week. A myriad of formats for learning will be included:

- An expanded discussion of basic pathophysiologic mechanisms which a physician-scientist should know;
- Description/demonstration of laboratory technologies used to produce the basic science data required to test the hypothesis;
- Discussion of animal or human study design and analysis with an emphasis on problem-solving skills;
- Journal club format with reading of a recent research publication describing a ground-breaking discovery or method, including a facilitated discussion of the study’s strengths and weaknesses.

An additional benefit of these sessions will be the identification of UF faculty and laboratories that the MD-PhD Scholar might engage for one of the laboratory rotations for consideration as the sponsor of the PhD dissertation.

Week	Month	Day	Monday	Tuesday	Wednesday	Thursday	Friday			Week	Month	Day	Monday	Tuesday	Wednesday	Thursday	Friday								
Class of 2022			CLG in Afternoon																						
	July 2018	30	2018-2019			Orientation																			
1	Aug	6	Genetics and Health Harfe (4 weeks)						Intro to Clinical Medicine 1 Cooke/Harrell Research & Discovery Allen/Beyth				2019-2020												
2		13																	Gastroenterology and Hepatology (GI) Stevens/Forsmark (5 wks)			Intro to Clinical Medicine 3 Wright			
3		20																							
4		27																							
5	Sep	(4)	Holiday			Foundations of Medicine Aris (12 wks)				1	Aug 2019	19													
6		10																							
7		17																							
8		24																							
9	Oct	1	Intensive: Nutrition Carter																						
10		8																							
11		15																							
12		22																							
13		29	Foundations of Medicine																						
14	Nov	5																							
15		(13)								Holiday			Thanksgiving			6		23	Clinical Neuroscience Mandel/Rahman (7 wks)						
16		19																							
17		26																							
18	Dec	3	CSE & Preceptorship Preparation			Preceptorship 1A Konopack (3 wks)				7	Oct	7				Homecoming									
19		10																							
20		17																							
21		24	Holiday (2 wks)							Preceptorship 2			8		14				Intensive: Pain and Addiction Averbuch						
22		31																							
23	Jan 2019	7	Intensive: Health Policy Herndon			Thanksgiving							9		21	Dermatology and Musculoskeletal Hahn/Merkel (4 wks)									
24		14																							
25		(22)	Holiday							Fundamentals of Microbiology & Immunology Gulig (5 wks)			10		28				Preceptorship 2						
26		28																							
27	Feb	4																							
28		11																							
29		18	Intro to Cancer Biology & Clinical Oncology Lynch (2 wks)																						
30		25	Spring Break																						
31	Mar	4	Respiratory Systems Sayeski/Lascano (4 wks)																						
32		11																							
33		18																							
34		25																							
35	Apr	1	Cardiovascular Systems Sayeski/Park (4 wks)																						
36		8																							
37		15																							
38		22																							
39		29	Preceptorship 1B																						
40	May	6	Kidney and Urinary Tract (Renal) Clapp/Kazory (4 wks)																						
41		13	Holiday																						
42		20																							
43		(28)																							
44	Jun	3																							
45		10	BSE																						
46		17	Discovery/Vacation (10 wks)																						
47		24																							
48	Jul	1																							
49		8																							
50		15																							
51		22																							
52		29																							
53	Aug	5																							
54		12																							

Figure 3. Didactic Coursework for MS1 and MS2 Years

(c) Required PhD Curriculum (GS1, 2). The didactic coursework for the PhD Degree will vary between PhD curricula across the 10 participating PhD Programs (Table 1). The PhD degree at UF requires at least 90 credit hours. A Qualifying Examination is required to continue to the dissertation research. The requirements for Scholars will be the same as for PhD Candidates. The MCAT fulfills the standardized test requirement for application to the UF Graduate School. In the unusual case of medical school admission without an MCAT (e.g. UF Medical Honors Program), the GRE may be taken to fulfill UF requirements for a standardized admission test. The Graduate School Dean facilitates cross-college issue resolution.

Table 1. PhD Programs at UF Participating or Affiliated with UF MD-PhD Program

College	Doctoral Programs	# Grad. Students 2019-20
Medicine/ Dentistry**	Biomedical Sciences*	182
	Health Outcomes and Policy*	5
	Biomedical Informatics*	7
	Medical Physics	15
	Epidemiology (Joint with PHHP)*	29
	Genetics and Genomics (Genetics Institute)*	27
Nursing	Nursing Science	27
Pharmacy	Pharmaceutical Sciences**	104
Public Health and Health Professions	Biostatistics (Joint with Medicine)*	30
	Clinical Health Psychology*	76
	Communications Sciences	30
	Public Health-Health Services Research	5
	Public Health - OneHealth	15
	Public Health – Environmental Health	6
	Rehabilitation Sciences*	32
Veterinary Medicine	Veterinary Medical Sciences**	34
Engineering	Biomedical Engineering*	91
Liberal Arts and Sciences	Anthropology*	106
*Included in MD-PhD; ** Dual Doctorate Program Affiliated with MD-PhD Program		

(d) Team Science. An innovative feature of the UF MD-PhD is the opportunity to participate in a TL1 Team Science Program sponsored by the CTSA Program and directed by Wayne McCormack, PhD. PhD students, including MD-PHD Scholars, are encouraged to apply for TL1 positions as 2 or more person teams in which partners pursuing their PhD in different Colleges help each other design additional “team specific aims” to expand the scope of their individual dissertation research projects via authentic interdisciplinary collaboration. The research mentoring committee includes the Primary Mentor from the partnering student’s PhD thesis. The TL1 has CTSA funds supplemented by several departments and colleges to support 8-10 TL1 pre-doctoral fellowships per year with funding for two years, thus not requiring research grant or departmental funds. The Team Science PhD Program has been ongoing at the UF CTSA Program for four years with excellent results. At the end of the GS4 year and defense of the PhD Degree, additional efforts will be made for research preparation and publication to continue in MS3 and MS4 years. At a minimum, the Scholars will be supported to complete the manuscripts developed for their thesis research and to get them published in peer-reviewed journals, preferably in the GS1-4 years. They may, however, require time set aside for this activity in MS3 and MS4, as planned in the Scholar’s IDP.

(e) Quantitative and Experimental Design Curriculum. Recognizing that each of the 10 PhD Programs may have specific course requirements in this area, a basic understanding of experimental design and core qualitative skills is required for virtually any career in biomedical science. One solution built into the UF MD-PHD is a Clinical and Translational Science Co-Major. The entire major can be taken as a highly recommended elective, but Scholars should complete at least one epidemiology or clinical research/experimental design course relevant to dissertation research (usually 3 credits) and one biostatistics/bioinformatics course relevant to their dissertation research (usually 3 credits).

(f) Opportunities for Curricular Integration, Synergy and Efficiency. MD-PhD Scholars satisfactorily completing MS1 and MS2 years will receive 24 credits toward their Biomedical Science PhD, leaving the typical Scholar with 66 credits to acquire in the GS1-4 years. Other PhD Programs have similar policies as appropriate depending on overlapping coursework. MD-PhD students are granted up to 16 credits toward their MD degree based on their graduate curriculum, providing additional flexibility to their scheduling. The summer periods before and between the MS1 and MS2 years contain opportunities for HIPAA and IRB Certification. The Clinical Practicum described in the following paragraph serves an integrating role, offering hands-on clinical research experience under supervision of a Mentor during the didactic portion of Medical School. Similarly, during GS1, Scholars will participate in a one credit online course on Rigor and Reproducibility of Research and complete the Responsible Conduct of Biomedical Research Course. With the granting of dual credit during the clinical clerkships for MS3 and MS4, there are multiple opportunities to continue writing, composing, presenting, and publication of manuscripts emanating from the PhD dissertation research, prior to graduation. Nationally, there is a significant concern regarding the development of biomedical scientists and the time to being awarded a faculty level first R-grant. We feel that with consistent and effective mentoring, early experience to and choice of thesis advisors, enhanced integration of the MD and PhD programs, and thoughtful structuring of transitions, we can reduce this time to graduation by up to one year for some Scholars.

Career Development Opportunities:

(a) UF MD-PhD Leadership Curriculum:

A five-session curriculum on leadership development will be directed by Alex Sevilla, PhD, Associate Dean of the Heavner School of Business. The MD-PhD Leadership Program has been in place since 2016 and has consisted of four half days during the orientation at the beginning of MS1. The 2019 Program began with two half day introductory sessions by Dr. Sevilla, followed by three case examples in which the newly acquired concepts are applied: one on research leadership in the Practicum in MS1; one on clinical leadership in the Equal Access Clinic in GS1; one on the educational leadership in the Spring Symposium in GS2. Each module will be evaluated for fulfillment of each respective module's learning objectives. This will allow the Leadership Curriculum to span MS1 to GS4 years of the Program and illustrate leadership in several career roles.

(b) Professional Skill Building Workshops:

In year GS3-GS4, Scholars can participate in a 24-month series of monthly workshops. Our follow-up surveys of graduates of UF COM PhD Programs since 1996 identified substantial numbers of graduates having major roles in teaching, mentoring, laboratory management and communications. The CTSA Translational Workforce Development Program now offers a monthly "Learn, Discover, Lead" series of teaching, mentoring, leadership, communication, team/science collaborations, and laboratory management over a 24-month cycle (see syllabus in Appendix). Each is provided in a workshop format, often with small group or individual engagement in activities. MD-PHD Scholars are highly encouraged to attend the entire 24-month series.

(c) Career Interest Seminars:

The monthly MD-PhD Scholar meetings will feature speakers each year from academia, of course, but will also include scientists with careers in entrepreneurship/start-ups, industry such as pharmaceuticals, regulatory/government (e.g. FDA, NIH), science advocacy and community outreach, and education. Scholars interested in learning more about these employment sectors will be able to arrange interviews, shadowing, and short-term placements with scientists in these positions.

(d) Grant Writing Coursework and Grant Preparation/Submission:

All Scholars will be encouraged to participate in GMS 5905 Grant Writing Course directed by Dr. Clay Matthews at the end of GS1. This 14-week course provides both didactic information on the grant funding process and the preparation of an effective application, but also produces some sections (e.g. Specific Aims, etc.) of an actual grant application. The application for most Scholars will be written for the F30 Award, requesting funding for the remainder of GS2-4 plus the MS3 and MS4 years. These applications have enjoyed a significant rate of success. Some Scholars may apply for F31 Awards, especially if the award is limited to underrepresented minority groups to which the Scholar belong. After the course, the Scholars will be encouraged to complete their F30 application under supervision of their Program Mentor and mentoring committee. All applications will undergo the scrutiny and constructive feedback by a Mock Study Section

consisting of UF HSC faculty and F30/31-funded MD-PHD scholars. The review will be conducted in a way identical to that used by NIH in the presence of the Scholar. This will occur four weeks prior to each F30 application deadline (three per year) to provide time for revision of the application.

(e) Opportunities for Teaching and Mentoring:

Graduate students in many of the PhD Programs in the HSC have no requirement for teaching or to be a teaching assistant. The Scholars interested in teaching as a career goal should identify this interest in the IDP and develop a plan to meet this need with their mentor in one or more didactic courses. The Mentor Development Program has an online course on mentoring for postdoctoral fellows that the Scholar could participate in. Scholars may also gain hands-on experience mentoring undergraduate members of the American Physician Scientist Association (APSA) undergraduate chapter. Currently, a Scholar is the ASPA chapter's advisor and the UF MD-PhD Program is committed to strengthening this relationship as a part of our Plan for Recruitment and Retention to Enhance Diversity. Senior scholars also have plenty of opportunity to serve as mentors and advocates for underclassmen and are expected to assist the decision-making progress of junior trainees as mentors.

Elective Activities. During MS1-2 and GS1-4, Scholars will be strongly encouraged to participate in at least three elective programs. First, the MD-PhD Leadership Development Program will consist of four modules, consisting of a Leadership Primer the summer before MS1 and using the Clinical Research Practicum during MS1-2 as an application experience, a Leadership & Research module during GS1 using dissertation launch and Spring Symposium/Research Day planning as application experiences, a Leadership & Healthcare module during GS3 using a project in the Equal Access Clinic and re-entry into medical school as application experiences, and a Leadership Capstone module in MS4 with a focus on education using residency launch as an application experience. The Leadership Development Program will have a co-leads, Wayne McCormack, PhD, and Alex Sevilla, PhD, of the UF School of Business where he teaches leadership development in the context of business. A second elective opportunity is a new workshop in Systematic Literature Review, offered by the UF HSC Library. This includes identification of a topic (especially that relates to their PhD dissertation), the identification of pertinent literature on the topic, data extracted from identified studies, and analysis and presentation of the systematic reviews and answers to key questions. This should improve the number and quality of the Scholar's publications from their thesis research. A third strongly recommended elective is to complete the entire Clinical and Translational Science Co-Major, which would be so identified on the PhD Degree transcript. Both the UF MD-PHD required courses already overlap with nine of the thirteen credits [RCR (1), Team Science(2), Experimental Design (3) Quantitative Skills (1), Rigor and Reproducibility(1), Grant Writing (1)] with only GMS 6847: Translational Research and Therapeutics: Bench, Bedside, Community, & Policy (3 credits), a CTS Journal Club (1 credit), and CTS Seminar (2 credits) additionally required. These six credits would fulfill credit requirements for the PhD Degree. This elective should be most beneficial for those interested in clinical, population, and data science, but provide breadth for those interested in the basic biomedical sciences as well.

Mentored Research Experience

(a) Patient-Oriented Research Practicum

The UF MD-PhD Practicum was organized in 2009 with its first study by participating MS1 Scholars in 2010-2011. It has enjoyed strong faculty leadership and mentorship by experienced clinical investigators. The Practicum Director for the past three years has been Coy Heldermon, MD, PhD, Associate Professor of Medicine (Oncology). The practicum is initiated during orientation and includes the GM 7093 course from the CTSI, Introduction to Clinical and Translational Research in afternoon sessions. The morning sessions include introduction to resources at UF HSC and UF Clinical and Translational Science Institute, including the Office of Clinical Research, Patient Advocacy Program, the Clinical Research Center, the Investigational Drug Service, and the HSC Library. Practical considerations for clinical study design, such as development of a clinical research question, literature search approaches, study design, data management, statistical assessment, analysis of data, and study finances are explained through case studies. Ethical and regulatory considerations are introduced, such as HIPAA compliance, Institutional Review Board, the Declaration of Helsinki, Belmont Report, US common rule, etc. The remainder of the time is spent developing an idea for a Patient-Oriented Clinical Research Study supervised by Dr. Heldermon as Principal Investigator/ Faculty Director. The 2-4 KL2

Scholars (all junior faculty members) from the UF CTSA Program are available, along with Dr. Heldermon, for “brainstorming” ideas that could be developed. One deliverable from this session is the generation of a hypothesis-driven research question. A second deliverable from the first two sessions of the Leadership Curriculum (see below) uses the Practicum Project as an experience in Research Leadership and Teamwork, in which the group generates a research proposal. The Scholars are encouraged to include other faculty in the honing of the question and eventual development of a research proposal.

The Practicum also provides access to a Biostatistician, who has considerable experience in clinical research and clinical data analytics. As shown in Figure 2, the Practicum is typically carried out over MS1-GS4 years during which MD-PhD Scholars design a study, write an application for internal funds for submission to the UF CTSI, develop a budget, write a proposal and research participant consent form under the supervision of Dr. Heldermon. These materials are submitted to the IRB; after approval is obtained, data are collected and analyzed, the results are prepared for publication. Table 2 shows the research topics for the eight Practicum projects carried out since 2010. The 2013-2014 project, for example, has been recently published in the journal, *Vaccines*, and the 2014-2015 project titled “Obesity and STING1 genotype associate with 23-valent pneumococcal vaccination efficacy” is published in *JCI Insight*.

Table 2. MD-PhD Clinical Research Practicum Projects ('10 – '18)

Cohort Year	Project
2010 – 2011	The effect of Intermittent Fasting on Adaptive Oxidative Stress Response and Mitochondrial Biogenesis
2011 – 2012	The Effects of Hyperoxia on Cytoprotective Factors and Inflammation
2012 – 2013	NO PROJECT/CRC Transitioning from Shands to Clinical Translational Research Building (CTSI)
2013 – 2014	The Effect of Short-Term Atorvastatin Treatment on Immune Response to Pneumovax 23
2014 – 2015	The Effect of Obesity on the Immune Response to PPSV23
2015 – 2016	Assessment of Satiety Following Oral Administration of an Erythritol Sweetened Beverage
2016 – 2017	Searching for Biomarkers of Chronic Stress in Medical Students
2017 – 2018	The Impact of Non-Nutritive Sweeteners and Soluble Fiber on the Human Microbiome
2018 – 2019	Metabolic and Microbiome Crossover Following Chronic Artificial Sweetener Ingestion
2019 – 2020	Frailty and Pre-habilitation in Patients Scheduled for Complex Lumbar or Thoracolumbar Spine Surgery

(b) Entering Research: Training to be a Mentee

Scholars will receive Entering Research training in GS1 at the beginning of their lab rotations. Entering Research is an evidence-based, interactive curriculum that introduces trainees to the culture of research and teaches them skills for successfully navigating their mentoring relationships. Training curriculum and train-the-trainer programs are available through the National Research Mentoring Network (NRMN). The NRMN offers curricular resources designed by the Wisconsin Center for Educational Research (Center for the Improvement of Mentoring Experiences in Research). This program trains Scholars to: empower mentees at different career stages; excel in their research training experiences; and engage in productive, mutually beneficial relationships to effectively work with their mentors and navigate the research environment. Research mentee training is a proven, structured approach to help mentees develop these skills. Entering Research curriculum has activities that address 7 areas of trainee development: research communication & comprehension skills; practical research skills; research ethics; researcher identity; researcher confidence & independence; equity & inclusion awareness & skills; and professional & career development skills. Dr. Yulia Strelakova, Educational Developer and Evaluator for the MD-PhD Program completed Entering Research facilitator training in July 2019, and will offer this training beginning in 2020.

(c) Matching of Incoming Scholars with Mentors/Laboratories: Required Research Rotations

Scholars have their initial mentored research experience in MS1 and MS2, when they are required to participate in 2-3 rotations in laboratories in which they are considering to conduct their dissertation research. This may occur as early as the summer before MS1, but usually occurs in the summer between MS1 and MS2. After MS2 year, additional rotations may be necessary to assure attainment of student needs for a laboratory experience. Laboratories are identified from the list of UF MD-PhD mentors with the assistance of one or more faculty from the MD-PhD Directorate, interactions with faculty in medical school classes, seminars, or by discussions with other MD-PhD Scholars. The computerized list maintained by the OBRCD has, for each of

284 mentors, the Mentor's background and research interests and funding, as well as a list of current graduate students and postdoctoral fellows. The Scholar will contact the mentor to discuss a position and to arrange each 2-6 week laboratory rotation. Scholars pursuing a population/data/behavioral science, wherein such rotations are unusual, may speak with the directorate about how best to identify mentors (i.e. doing fieldwork or taking language classes in preparation for fieldwork).

A guide of activities and expectations for the rotation is provided to Mentors and Scholars during orientation. The goal of the guide is to address both personal and professional perceptions: Personal perceptions deal with the culture of the laboratory, management style of the Mentor, work style of staff and students, etc. Professional perceptions deal with the laboratory's research programs, facilities, technologies, etc. Expectations do not usually include production of scientific work, unless it contributes to learning about whether the laboratory is a "good fit" for the Scholar. After completion of their research rotations, the Scholar should have selected a laboratory which shares his/her career goals, is affiliated with the PhD Program of interest, and has a mentor who can support their dissertation research, tuition, and stipend, and timeline for GS1-3/4.

The first step in confirming the Mentor-Scholar match-up is the development and approval of an Individual Development Plan (IDP) which is developed jointly by the Mentor and Scholar. An IDP especially developed for the UF MD-PhD Program has been developed (See Appendix). The IDP with the goals, expectations, and timeline of both the Mentor and Scholar will be reviewed and approved by the Directorate early in GS1.

(d) Mentored Research for PhD Degree

The Scholar should have a laboratory and mentor identified prior to GS1 as a result of laboratory rotations and visits with potential mentors, etc. in MS1 and MS2. If this was not achieved, additional laboratory rotations might be needed in the summer between MS2 and GS1. The Program Mentor and Scholar should meet regularly in GS1 to develop an Individual Development Plan (IDP), which includes didactics, mentored research, and career development activities. The IDP is developed by the Scholar, reviewed and endorsed by the Mentor, and submitted to the MD-PhD Directorate for review and approval. The research should progress during the graduate program after qualifying examinations in the PhD field. The research should allow a dissertation proposal to be developed for presentation and approval according to the rules of the Department and Graduate School. The Scholar will be asked to create a multidisciplinary mentoring committee to provide advice not only on the research but also professional and skill development.

Each Scholar should identify co-mentors, including a clinical mentor (see below) and preferably two additional faculty from different disciplines/departments/colleges. The large UF MD-PHD mentor list (284 mentors) is developed to be a primary resource for Scholars, which should also provide diversity in age, gender, race/ethnicity, discipline and other factors.

Clinical Training during MD-PhD Program

(a) Clinical Curriculum for the MD Degree (MS3, MS4)

Scholars have immersive clinical experiences (preceptorships) beginning in the fall of their first semester of Medical School and each following semester prior to beginning their clinical clerkships. The MD curriculum has 64 weeks of required clinical rotations in medicine, pediatrics, surgery, ob-gyn, psychiatry, family medicine, neurology, emergency medicine, critical care and gerontology over 86 weeks of the curriculum in MS-3 and MS-4, with additional weeks available for electives, research, etc. (see Figure 4). Scholars can request 4 credits per year of Graduate School up to 16 weeks dual credit toward their MD. The Program strongly encourages the Scholar to take one additional clinical rotation in the last quarter of MS-2, prior to GS-1, to provide the Scholar with additional clinical experience and context as they develop their research program in GS1-4. This also provides credit toward the MD degree that do not need to be acquired in MS4, thereby freeing up elective time for completion of presentations and publications of their dissertation research.

(b) Elective Clinical Opportunities: Equal Access Clinic

Almost all Medical Students participate in the Equal Access Clinic (EAC) during their time at UF. The EAC is a family of student-run healthcare clinics that have provided healthcare free of charge to Gainesville residents for 27 years. Its vision is to improve the physical, mental, and social well-being of all through community-level interaction. The EAC has always been self-supported, from its partnership between UF College of Medicine, community organizations such as the Salvation Army, private donors, UF College of Medicine Alumni

Clerkship Rotations - Class of 2021

updated 10/30/18

SUMMER 2019				FALL 2019				HOLIDAY				SPRING 2020			
A	Pediatrics Rotation 1 5/13-7/5 8 weeks A/B	Medicine Rotation 2 7/8-8/30 8 weeks A/B		Surgery Rotation 3 9/3-10/25 8 weeks A/B	Family Med & Neuro Rotation 3 10/28-12/20 8 weeks A/B/C			FM & Neuro Rotation 3 1/6-1/31/20 4 weeks A/B/C	Elective or vacation 2/3-2/14 2 weeks A/B/C	OB/Gyn Rotation 7 2/17-3/27 6 weeks A	Psychiatry Rotation 8 3/30-5/8 6 weeks A				
B										Psychiatry	OB/Gyn				
C	Medicine Rotation 1 5/13-7/5 8 weeks C/D	Surgery Rotation 2 7/8-8/30 8 weeks C/D		Pediatrics Rotation 3 9/3-10/25 8 weeks C/D						Rotation 7 2/17-3/27 6 weeks B/C	Rotation 8 3/30-5/8 6 weeks B/C				
D						OB/Gyn Rotation 5 10/28-12/6 6 weeks D/E	Elective or Vacation 12/9-12/20 2 weeks D/E	Psychiatry Rotation 6 1/6-2/14 6 weeks D/E	Family Med & Neuro Rotation 4 2/17-5/8 12 weeks D/E/F						
E	Surgery Rotation 1 5/13-7/5 8 weeks E/F	Pediatrics Rotation 2 7/8-8/30 8 weeks E/F		Medicine Rotation 3 9/3-10/25 8 weeks E/F	Psychiatry Rotation 5 10/28-12/6 6 weeks F	Elective or Vacation 12/9-12/20 2 weeks F		OB/Gyn Rotation 6 1/6-2/14 6 weeks F							
F															
HOLIDAY															
G	Family Med & Neuro Rotation 1 5/13-8/2 12 weeks G/H/I		OB/Gyn Rotation 3 8/5-9/13 6 weeks G	Psychiatry Rotation 4 9/16-10/25 6 weeks G	Surgery Rotation 4 10/28-12/20 8 weeks G/H			Pediatrics Rotation 5 1/6-2/28 8 weeks G/H	Medicine Rotation 6 3/2-4/24 8 weeks G/H						
H			Psychiatry Rotation 3 8/5-9/13 6 weeks H/I	OB/Gyn Rotation 4 9/16-10/25 6 weeks H/I											
I								Surgery Rotation 5 1/6-2/28 8 weeks I/J	Pediatrics Rotation 6 3/2-4/24 8 weeks I/J						
J	OB/Gyn Rotation 1 5/13-6/21 6 weeks J/K	Psychiatry Rotation 2 6/24-8/2 6 weeks J/K		Family Med & Neuro Rotation 2 8/5-10/25 12 weeks J/K/L					Elective or vacation 4/27-5/8 2 weeks I/J						
K															
L	Psychiatry Rotation 1 5/13-6/21 6 weeks L	OB/Gyn Rotation 2 6/24-8/2 6 weeks L			Pediatrics Rotation 4 10/28-12/20 8 weeks K/L			Medicine Rotation 5 1/6-2/28 8 weeks K/L	Surgery Rotation 6 3/2-4/24 8 weeks K/L						

Figure 4. Required Clinical Rotations in MS3 and MS4

Association, and faculty and resident physician volunteers from UF HSC. Since opening in 1992 by UF Medical Students, Dental Students joined in 1997 and now health professions students and faculty from four HSC Colleges (Medicine, Dentistry, Pharmacy, Public Health) are included. EAC serves as a point of access to healthcare for medically underserved populations in the local community in an inter-professional model of healthcare delivery. It has grown to five primary medical clinics in the Gainesville Community, including sites at public libraries, churches, etc. There are also four specialty clinics providing mental health services, community dental care, women's services, and occupational and physical therapy. In 2010, a mobile clinic (bus) was added to provide care to "hot spots" of need. The EAC is believed to be the longest, most comprehensive continually operating student-run clinic in the US.

The participation of the Scholars is voluntary, but the leadership and staffing have extensively relied upon MD-PhD Scholars in the GS-1 to GS-4 years. All clinical activities are supervised by credentialed faculty volunteers. Roles of Scholars have ranged from patient advocates, care providers, administrators, grant writers, etc. The EAC provides regular, high quality, supervised clinical experience for Scholars during the GS1-4 years. Participation of all MD-PhD Scholars has been the norm for many years.

A third session of the leadership curriculum will be carried out during the EAC clinical experience in GS1. The Scholars will be asked to consider the development of a clinical service activity which will benefit the patients or providers of the EAC. Dr. Sevilla will return for a half day workshop with a module to illustrate leadership in clinical care development.

MD-PhD Transitions Program

(a) Overview. The UF MD-PhD Program is fully committed to the retention of highly qualified and motivated students in the program by providing them the training, resources, and support that are essential to their success. MD-PhD training programs are defined by transitions between different phases of training: undergraduate transition to preclinical (basic science), medical school preclinical (basic science) transition to graduate school research training, and then back to medical school clinical training, ending with preparation for postgraduate clinical residency. Dr. Zarrinpar will direct a Transition Program for Scholar Retention with specific reintegration components. These include clinical initiatives prior to returning to medical school, a clinical elective experience in Graduate School, and specific Plan for Clinical Mentoring at each transition with the involvement of a Clinical Mentor for each Scholar.

(b) Multi-modal Mentoring/Advising:

Physician-scientist faculty: The sense of isolation and uniqueness can be countered by specific mentoring from physician-scientist faculty. While it is important to have clinical mentoring (from MD Clinical Mentors) and research mentoring (from PhD science mentors), it is essential to also have mentoring and advising from faculty with dual degrees (including MD-MPH, MD-MS, etc.) who engage in both clinical practice and research. Their experience and their responses to the challenges uniquely faced by physician-scientists usually aligns most with MD-PhD students. We have recruited many physician-scientist faculty members to serve in the program as potential mentors and the Directorate will ensure that trainees are assigned appropriately.

Advanced MD-PhD students: There are a number of issues that arise during the training period specific to either the University or logistics of each training program. It can be difficult for faculty members to learn about or appreciate these issues, though they may be of high importance to trainees. We have established at UF an MD-PhD Scholar Council that will provide mentoring and guidance to trainees by the more senior MD-PhD students. This will allow issues to be raised and discussed that are either inaccessible to the faculty or deemed either inappropriate or difficult to discuss with faculty, whereas discussion with a colleague a few years ahead in the program would greatly help.

Specific mentoring during transitions (MD-to-PhD, PhD-to-MD, MD-to-residency and beyond): Transition times can be contentious and difficult. For each appropriate class, dedicated advising sessions and mentoring will be built into the program to assist with transitions to the next step. Importantly, this will continue after the third and fourth year of clinical training to ensure that trainees are provided with adequate support in their application to residency, selection of residency programs, and even beyond.

(c) Transition Facilitation Programs

MD-to-PhD Transition:

Publications/Productivity in the Lab: The Directorate works closely with mentors to make sure that trainees continue to write manuscripts and abstracts and give oral presentations during the Ph.D. training.

Mentoring: A Directorate member reviews student productivity twice a year (with the inclusion of the Scholar's PhD mentor) as part of IDP reviews. In addition to presentations at national and international meetings, publications in highly-regarded, peer-reviewed journals are expected. A formal presentation of all papers at faculty meetings prior to presentation at national meetings will be conducted such that feedback provided to the trainee will enhance clarity of expression and quality of presentation. Scholars will be expected to present their research project and its potential clinical application at the Fall Retreat, the Spring Symposium, and/or Departmental Research Series.

PhD-to-MD Transition:

Clinical skills and clinical mentoring during PhD: Addressing the challenge of starting clinical training after several years of graduate school, Scholars may shadow physicians (Clinical Mentors) throughout the research training period, specifically increasing in frequency several weeks before beginning clinical clerkships. Clinical training is essential to a balanced training program. Acquisition of clinical sensibilities and skills requires deliberate teaching and practice. We have recruited a group of Clinical Mentors with the ability and desire to teach and mentor Scholars during the PhD training period. Clinical Mentors will meet regularly with a small number of students and do case presentations, reviewing the process from history and physical through the workup and to treatment. Trainees will have the opportunity to choose a primary Clinical Mentor for mentoring, as well as attend case presentations and patient rounds with other Clinical Mentors. Options made available to PhD students by Clinical Mentors: working on a team with them to get preclinical exposure, longitudinal clinical experience during the PhD years, such as in a student run access clinic, or a prolonged weekly family medicine clerkship toward the end of PhD to ease the transition back into medical school.

Reimmersion: A reimmersion program run by students and faculty will help enhance trainee skills (dexterity) and readiness (mental preparation, patient H&P, clinical presentations) to begin their clinical training. Part of this reimmersion program is an intensive session at the Dr. Angelo and Alberta Anaclerio Learning and Assessment Center to review physical examination skills. The program also hosts a dinner between GS3/4 students and MS3/4 students to discuss the transition period and how best to prepare to re-enter medical school.

Beyond Being a Trainee/Transition to Practice:

An additional intent of this research training program is to provide continued support for trainees after they graduate as they prepare for the next step in their academic training. The faculty recognizes their responsibility to assure that the benefits of the training program are not lost during the two years required by the trainees to complete their MD. This can only be accomplished through sustained interest by the research and clinical mentors, as well as by the Directorate, in the academic progress of the trainees. The current model at UF is to maintain a close ongoing relationship with research mentors for the final clinical years. In the majority of cases, trainees have used the remaining years of the program to complete manuscripts. It is not unusual to have work published during the last year of their clinical training, one to two years after completing the data collection and data analysis.

Scholars in late MS3 and MS4 will meet with Dr. Zarrinpar to identify research-oriented postgraduate medical training. A number of Physician Scientists Training Programs (PSTP) have been identified mostly in Medicine, Pediatrics, and Neurology. These programs will be the focus of MD-PhD Scholar's consideration for their internship/residency training. Residency in other specialties that have an academic focus on PSTP organization will be identified with graduating MD-PHD Scholars.

To further ensure that the goals of this training are completed and to verify that the research/clinical faculty have accomplished the objectives of this program, a plan for follow-up of the academic careers of trainees has been initiated. The UF MD-PhD Program Coordinators maintains a list of the trainees who will enter the academic community, trainees who will participate in active research (both basic and clinical), and the track record of individual trainees with regard to successful peer-reviewed grants and funding mechanisms. The purpose of this database is to enable the alumni of the UF MD-PHD to obtain continued scientific support and

advice from the research/clinical faculty of this program. This follow-up for 15 years is required of all trainees supported by NIH pre-doctoral, post-doctoral and career development grants including F and T awards.

PROGRAM GOVERNANCE, PERSONNEL, AND ADMINISTRATION

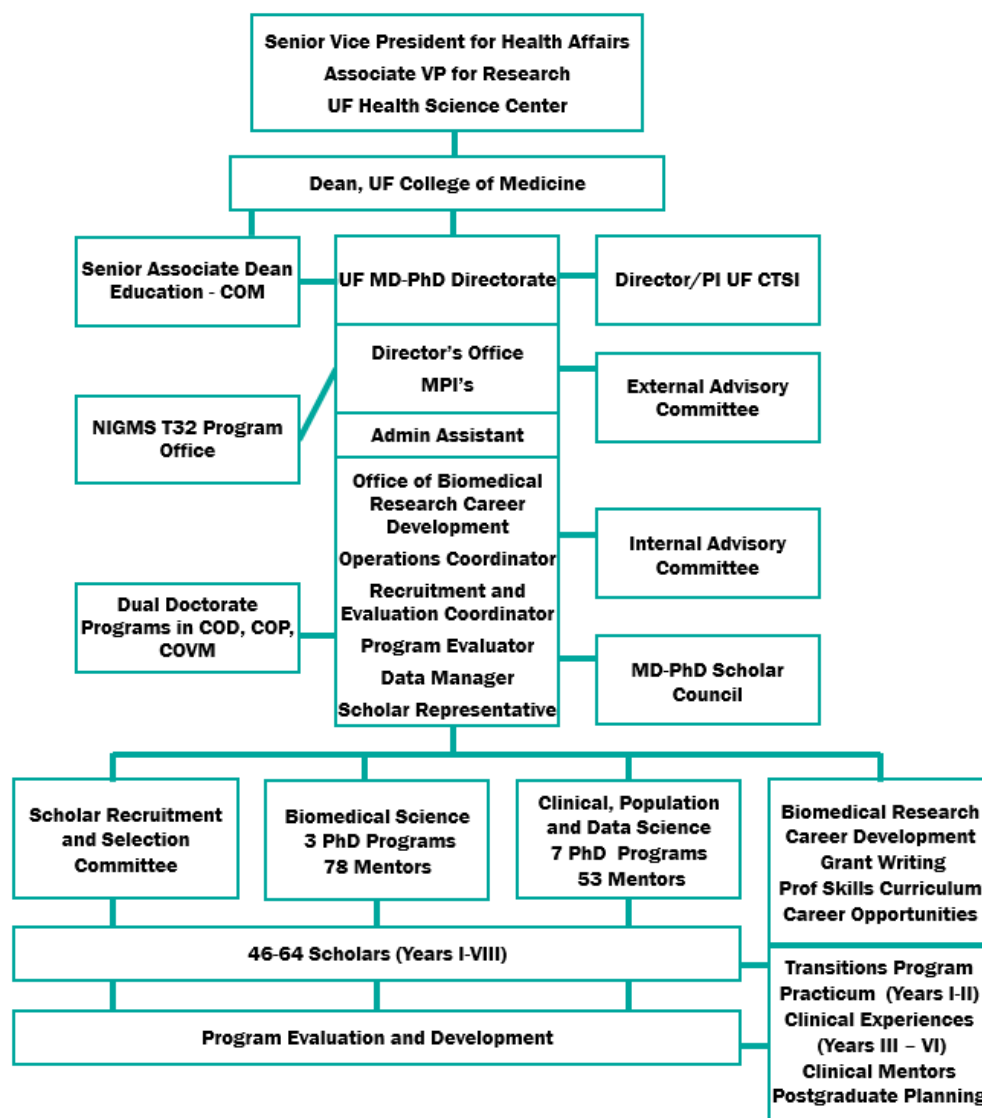


Figure 5. Organizational Chart of the UF MD-PHD

Administrative Organization (Figure 5)

UF MD-PhD Program Directorate reports directly to the Dean of the UF College of Medicine who in turn reports to the Senior Vice President for Health Affairs and President of the UF Health Science Center. The Directorate's Office consists of the Multiple Principal Investigators and an Administrative Specialist. Program activities carried out by the Office of Biomedical Research Career Development (OBRCD). The Program Coordinators carry out the day-to-day operations of the program. A faculty-level Evaluator, a Data Manager, and one to two representatives from the Scholar Council round out the Directorate. Direct communication linkages with the Directorate include the Senior Associate Dean for Education in the College of Medicine, and the Director of the UF-CTSI, which provides administrative support for this Program. The Directorate also has communication linkages with important advisory groups, including its External Advisory Committee. The Directorate also communicates with an Internal Advisory Committee, a committee consisting of Directors of dual doctorate programs in the UF Colleges of Dentistry, Pharmacy, and Veterinary Medicine, and the MD-PhD Scholar Council. Another important committee reporting to the Directorate is the Scholar Recruitment and

Selection Committee. The 10 PhD Programs and their Research Career Development Programs also communicate with the OBRCD related to Scholar progress in PhD training.

UF MD-PHD Directorate (See Appendix for Contact Information)

(a) Administrative Office and Meeting Facilities

The Directorate will be physically located in the fourth floor of the Clinical and Translational Science Building (CTRB room 4210) where Dr. Pearson and Mrs. Gipson occupy two offices in the Department of Epidemiology. These offices are one floor above the administrative offices of the UF Clinical and Translational Science Award, which administers this Program. The Office of Biomedical Research and Career Development (OBRCD) will administer most Program activities. It occupies a sizable suite of offices (2500 square feet) on the ground floor of the Communicore Building, including medium and small conference rooms furnished with distance learning technologies, rooms for Scholar Committees to convene, and offices for Coordinators and Data Manager. The OBRCD will convene Internal and External Advisory Committees, Scholar Council and other groups (Figure 6).

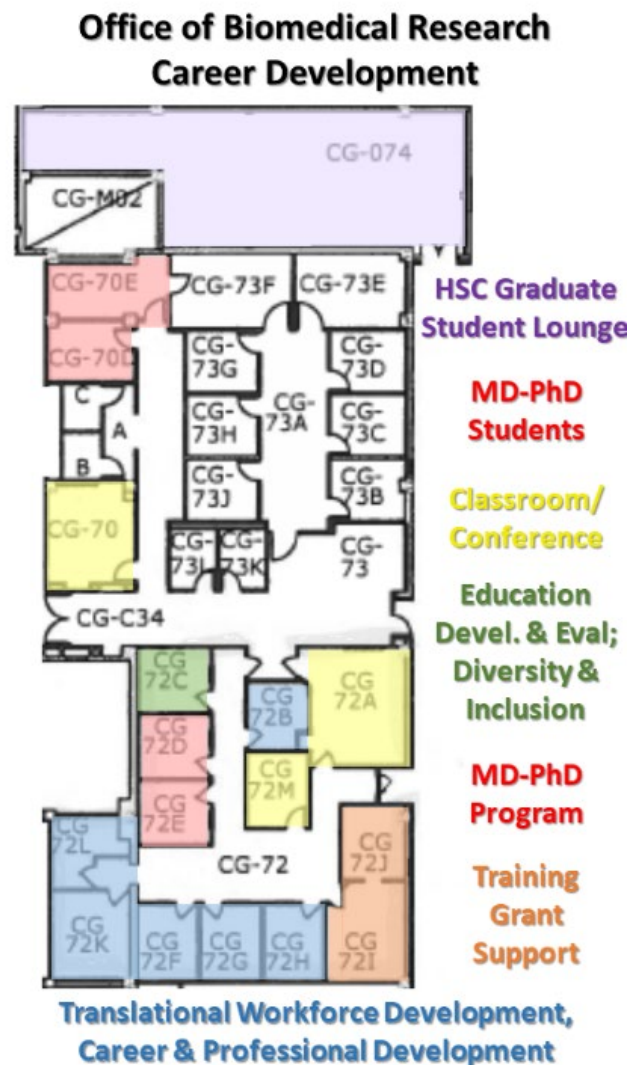


Figure 6. Floorplan of OBRCD

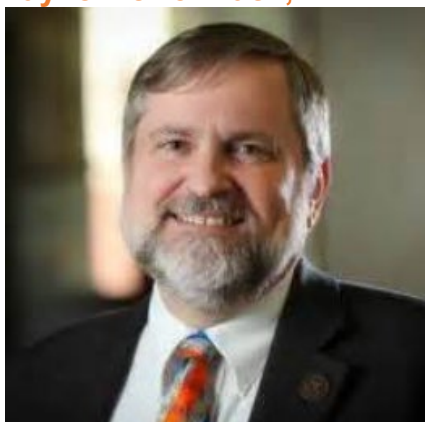
(b) Principle Investigators. A leadership team of four physician-scientist faculty will provide the breadth of leadership and scholarship required to meet the Program goals and objectives. The emphasis of this team is on diversity of demographics and disciplines, with two senior faculty administrators joined by two more junior faculty investigators. The Directorate meets as a group monthly with more frequent meetings with the various Committees and Programs.

Thomas A Pearson, MD, MPH, PhD



Dr. Pearson is the Director of the MD-PhD Program and Term Professor of Epidemiology and Medicine. Dr. Pearson received his MD, MPH and PhD degrees from Johns Hopkins and completed residencies in Internal Medicine and Preventive Medicine and Fellowships in Pathology and Cardiology, all at John Hopkins. Dr. Pearson's major research interest has been on the etiology and pathogenesis of atherosclerotic cardiovascular disease and related disorders of lipids and lipoproteins. He remains clinically active in Preventive Cardiology. Sponsored research since 1983 has entailed studies of basic pathology of human tissues and animal models, clinical studies, randomized trials, and cross-sectional and longitudinal epidemiologic studies. He has published over 365 papers, many in high impact journals. He has served on numerous NIH study sections and special emphasis panels, especially for NHLBI. He has been PI/PD for a large number of training and education grants (K07, KL2, K30, T32, R25).

Wayne McCormack, PhD



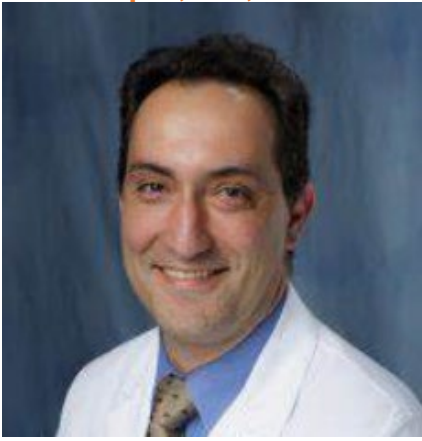
Dr. McCormack is Professor of Pathology in the College of Medicine. He directs the Office of Biomedical Research Career Development of the UF CTSa Program and the CTSa TL1 Program. Dr. McCormack directs experiential learning exercises in team science; coordinates multidisciplinary career experiences in industry, regulatory sciences, and community health; and oversees didactic coursework, such as the two-year cycle of Inter-professional Skill Development Seminars. He advises MD-PhD and other dual-degree program trainees. Dr. McCormack has been involved in every facet of graduate program planning, curriculum development, recruiting/admissions, and administration over the past 20 years. He also teaches Essentials of Graduate Research & Professional Development and Responsible Conduct of Biomedical Research. His education research focuses on team-based learning and competency-based assessment in graduate education, medical student peer evaluation, and humanism in medicine.

Kristianna Fredenburg, MD, PhD



Dr. Fredenburg is an Assistant Professor in the Department of Pathology. She has a PhD in Cell Biology and Toxicology from NC State University, followed by postdoctoral training at Duke University, and an MD from the University of North Carolina at Chapel Hill. She completed her residency and fellowship training in Anatomic Pathology at UF in 2015. She investigates the molecular and genetic basis of disparate outcomes of head and neck cancers between black and white patients. She relates well to MD-PhD students as a junior faculty with clinical, research, teaching and family responsibilities. Dr. Fredenburg has been a member of the MD-PhD Executive Committee since 2016. She has been especially active as a co-mentor for Scholars who are women and/or from underrepresented minority groups. She brings to the Program leadership an established commitment to MD-PhD training and a mentor/role model for our diverse Scholars. She chairs the Scholar Recruitment and Selection Committee.

Ali Zarrinpar, MD, PhD



Dr. Zarrinpar is an Associate Professor and Assistant Chair of Innovation of Surgery and Director of Research for the Division of Transplantation and Hepatobiliary Surgery. He received his MD-PhD in Biochemistry in 2005 from UCSF. He then completed residencies in General Surgery and Transplantation and Hepatobiliary Surgery at UCLA where he received a CTSA KL2 Award. He relocated to UF in 2017 with K08, R21 and UH2 awards from NIH. His research integrates immunity and inflammation, as well as cellular metabolism, growth, and activation at the molecular level. Dr. Zarrinpar has a strong mentoring track record and proves a strong role model for the Physician Scientist with clinical, research, teaching, and family responsibilities. Dr. Zarrinpar mentors Scholars in the transition between MS2 and GS1, GS4 and MS3, and MS4 and postgraduate medical education. He will be especially helpful to Scholars with surgical career interests and interacts with the Career Opportunities Program to facilitate exploration of careers outside academic medicine.

Other Key Personnel:



Yulia Strekalova, PhD is the *MD-PhD Evaluator*. Dr. Strekalova is a Research Assistant Professor and Director Grants Development and Evaluation Working Group of the TWD Program of the UF CTSA. She has an established career interest and track record in program evaluation, including evaluation of education and training programs, and is well versed in mixed methods approaches (qualitative and quantitative) for program evaluation. Dr. Strekalova has been responsible for establishing learning objectives and acquired competencies for the Program as well as development of the Logic Model and evaluation plan.



Wanda Aviles is the *MD-PhD Coordinator for Operations*. She provides day-to-day management of Programs and Projects, and organizes, convenes, and provides support to the Internal Advisory Committee, the External Advisory Committee, the Dual Doctorate Committee, and the MD-PhD Scholar Council. The Operations Coordinator assures scholar participation in OBRCD activities, including Professional Skill Development Series (GS1-2), Science Career Opportunities, Practicum (MS1-2), Clinical Experience (e.g. Equal Access Clinic), Clinical Mentoring and Postgraduate Planning. She will also integrate MD-PhD Programs with those of the 10 PhD Programs in which MD-PhD Scholars are pursuing PhD degrees. Wanda was born in Puerto Rico and has lived in Florida since 1999. Wanda completed her BLS with a major in Psychology from Barry University in 2017.



Kenneth Wynn serves as the *MD-PhD Coordinator for Recruitment and Evaluation*. He promotes the Program, facilitating the recruitment and selection of high quality, diverse applicants to whom offers of admission can be made. He staffs and supports the Recruitment and Selection Committee. He also maintains progress reports, Individual Development Plans, and productivity measures (i.e. meeting attendance, presentations at local and national meetings, publications, grant applications, and awards). This includes semi-annual meetings with the Scholars and Mentors to monitor progress on Individual Development Plans. He will also track graduates per the evaluation plan for at least 15 years following graduation. Kenneth is a graduate of UF, completing both Bachelor's and Master's degrees in Family, Youth and Community Sciences, with a concentration in Family Financial Management.



Mary Gipson serves as the *Administrative Specialist* for the UF MD-PhD Directorate. Mary coordinates the scheduling of the many committees and meetings of the Directorate. She also provides document development service for grant applications, handbooks, manuscripts, and correspondence related to the Directorate. Mary is a native of West Virginia and a graduate of the University of Kentucky with a BA in Communications.

Committees

Internal Advisory Committee (IAC)

This Committee consists of senior leadership within UF Health, the College of Medicine (COM) and the UF HSC Institutes. Their primary role is to provide an annual assessment of UF MD-PhD Program progress toward its Research Training Program Plan. A secondary role is to support the MD-PhD Directorate if controversies arise between among members or if there is a need to replace a member. The Internal Advisory Committee will be Chaired by Mark Segal, MD, PhD, a graduate of the UT Southwestern Medical Scientist Training Program and Senior Associate Dean for Faculty Affairs and Professional Development at UF College of Medicine. The IAC will convene twice annually, once at the end of the Spring Semester following graduation and a second time during recruitment of the new MD-PhD class in the Fall. A report on interim progress will be provided by the Directorate.

Isabel Garcia, DDS, MPH	Dean, UF College of Dentistry
Todd Golde, MD, PhD	Director, McKnight Brain Institute
Mark Segal, MD, PhD	Director, Division of Nephrology, UF COM
Elizabeth Shenkman, PhD	Chair, Health Outcomes and Biomedical Informatics, UF COM
Lee Sweeney, PhD	Director, Myology Institute, UF COM
Gilbert Upchurch, MD	Chairman of Department of Surgery, UF COM

External Advisory Committee (EAC)

The External Advisory Committee will consist of three senior faculty from institutions outside UF who have experience with MD-PhD Programs, preferably at the leadership level. Some of our planned EACOM members have served as consultants to the UF MD-PhD Program. The EACOM will be convened once a year in the fall semester, to assess the prior year and its recruitment of new and continuing scholars, and to review plans for the upcoming year.

Dual Doctorate Program Committee

The group will meet semiannually to assess opportunities for trainees in three other dual doctorate programs: DDS-PhD (Robert Burne, PhD), Pharm D-PhD (Maureen Keller-Wood, PhD), and DVM-PhD (David Pascual, PhD) which might integrate with programs offered to MD-PhD students. These may include program marketing opportunities; co-sponsorship of seminars or workshops; inclusion of other dual doctorate programs in grant writing courses (e.g. F30); attendance at the 24-month cycle of Professional Skill Development Workshops, and other career opportunities in industry entrepreneurship, government/regulatory, education, and advocacy.

Scholar Participation in Program Planning and Operation

One or two Scholars will participate on the Directorate/OBRCD as representatives of the UF MD-PhD Scholar Council. These will usually be the Chair and Co-chair of the Scholar Council. These positions should turnover annually or biannually. MD-PhD Scholars are regularly involved in curriculum/course development. One example is the three working sessions at monthly dinners to create impact goals leading to the UF MD-PhD Logic Model. The Scholar Council will designate specific student classes to participate in or be responsible for planning and implementation of specific programs. For example, the GS1 Scholars will coordinate with the Directorate regarding the Fall Retreat each year. GS2 Scholars will be responsible for identifying and recruiting the visiting speaker for the Spring Symposium.

PRECEPTORS/MENTORS

Finding Research Mentors at UF

The UF HSC, with its six Health Science Colleges juxtaposed on a single campus, provides excellent opportunities for interdisciplinary training through its large pool of potential mentors. We encourage the PhD dissertation committees, within the requirements of the college awarding the PhD degree, to employ a “mosaic” of mentors from different disciplines. Therefore, our mentor pool needs to be large enough not only to provide the Scholar with a range of primary mentors, but also to have several co-mentors which would enrich their dissertation research. The UF MD-PhD Program has built a diverse faculty of faculty-mentors through the T-Team program, in which the CTSI provides extraordinary support for current and prospective T Directors, and maintains a list of 284 current mentors in its current 23 T awards.

At UF HSC, a primary mentor is defined as a faculty member who has a track record of training as a mentor and have departmental or grant funds to support the GS1-4 years of the Scholar’s Training. UF HSC also has a category of mentors-in-development for junior faculty who have not achieved the mentor criteria. A list of 145 mentors has been drawn from the 284 faculty already formally identified as mentors on T Awards. These mentors, by definition, have agreed to commit time and effort to the mentoring of graduate students and/or post-doctoral fellows. This is taken into account in their allocation of their total academic effort. To join the mentor list, faculty mentors must participate in one of the 10 PhD Programs (3 from basic biomedical sciences, 7 population/data/behavioral sciences) and to have in excess of \$200,000 in direct costs currently awarded, which potentially could support the Scholar’s PhD dissertation program. Also, since all the mentors are active on T32 awards (currently funding 70 pre-doctoral positions each year), the Scholars would have access to that funding of their graduate school years as well.

A primary resource to help identify prospective PhD mentors is discussion with upperclassmen in the MD-PhD Program, particularly those who perform research in the same discipline. These students are often familiar with UF faculty members and can make suggestions of mentors who may fit a student’s professional and research interests. Ms. Audrey Natwick, the OBRCD Data Manager, also maintains a listserve of the 284 current mentors with their current research grants, graduate students, etc., which can be searched for consideration as mentors or co-mentors by the Scholars in MS1 and MS2.

Pairing Mentors with Mentees for PhD Dissertation

The identification of each Scholar’s mentors and co-mentors would ideally be completed before the start of the GS1 year. During MS1, the Scholar is encouraged to review the Mentor list for faculty in their areas of interest and to have had one-on-one meetings to hone the list down to 1-3 choices. The Scholar is then encouraged to have 2-6 week “laboratory rotations”, possibly prior to Year 1 but certainly in the summer between Year 1 and 2. The Scholars should then be able to commit to a mentor/laboratory for their PhD dissertation research. If the Scholar has not settled this issue by the middle of Year 2, a member of the Directorate will meet with the Scholar and additional laboratory rotations may be needed at the end of Year 2 or before the first year of Graduate School in September of the GS1 year. The laboratory will also have identified the funds to support the Scholar’s program from RO1, T32, TL1, or departmental sources.

Clinical Mentors

The challenge of starting clinical training after graduate school will be lessened by the Scholar’s Clinical Mentor who will meet regularly with the Scholars in GS 1-4 for case presentations, review of the history and physical process, and other shadowing experiences. They will also advise and oversee the Scholar’s longitudinal clinical experience in the Equal Access Clinic (See Retention Plan).

Semiannual Review of Individual Development Plans

A regular review of the Mentor-Scholar interaction and the quality of the mentoring provided is an important part of assurance of a productive PhD program for each MD-PhD Scholar. The Scholar’s Individual Development Plan (IDP) is reviewed with the Scholar by a member of the UF MD-PhD Directorate in the fall semester each year during the GS1-4 years. That review will include a Mentor Evaluation Form for completion by the Scholar to direct discussions of the quality and quantity of the mentoring received, especially from the primary mentor but also by co-mentors as described in the IDP. In the spring of each GS1-4 years, the Scholar and Mentor will meet with a Directorate member. Concerns about mentoring quality may require a meeting by a member of the MD-PhD Directorate with the mentor. Any discussion to change the primary mentor will be discussed by the entire Directorate in collaboration with the Director of the PhD Program of the Scholar.

SCHOLAR APPLICATION, ADMISSION, AND MATRICULATION

MD-PHD Class and Program Size

The UF MD-PHD has matriculated four to six Scholars per year over the past 10 years with high rates of retention. Our recent program reorganization will allow additional Scholars to be added to allow recruitment of 6-10 Scholars per year, with an eventual goal of 64 MD-PHD Scholars (8 per year class size).

Commitment and Efforts to Ensure Diversity and Inclusion

The MD-PHD Directorate is passionate about the recruitment and retention of individuals underrepresented in biomedical sciences, which include Blacks/African-Americans, Hispanic-Latinos, and Native Americans, and those with disabilities or from disadvantaged backgrounds. We aim to retain these diverse individuals through programs jointly implemented with the University of Florida Clinical & Translational Institute (CTSI) Working Group on Diversity and Inclusion.

UF has a documented history of dedication and success at recruiting URM undergraduate students and preparing them for professional or academic training. Since 2017, **UF ranks #1** in URM undergraduates applying to US medical schools (#3 for Black/African Americans and #2 for Hispanic/Latinos). **Our graduate school** enrollment level has increased its URM enrollment from 10% to 13% enrollment as recorded over the past 10 years. We **rank 2nd** among all US Universities in the number of Black or African American and Hispanic/Latino undergraduate students receiving degrees Biological and Biomedical Sciences. **UF ranks 4th** among all US universities in the number of Black/African Americans and Hispanic/ Latino students receiving doctoral degrees. From the aforementioned data, two key conclusions can be drawn: **1)** UF, as a whole, has the infrastructure in place to be a national leader in the recruitment of URM into the biomedical sciences (PhD and MD-PhD programs); **2)** To date, the UF MD-PhD Program has failed to capitalize on this infrastructure. The current MD-PhD directorate (as of December 1, 2018), at the request of the UF College of Medicine leadership (Interim Dean Adrian Tyndall), was put in place to address this failure. We aim to build recruitment and retention efforts that share our University's undergraduate recruitment success. The plan, as detailed below, will highlight the framework of diversity leadership; describe our efforts to build on the energy that has been generated over recent years; and discuss our retention efforts which will engage the programs already in place at our institution.

(a) Institutional Leadership:

UF has made a concerted effort in the recruitment and retention of leaders from diverse backgrounds. A major advancement towards this was recent hire of our inaugural Chief Diversity Officer, Dr. Antonio Farias, who along with 32 designated Campus Diversity Liaisons, aims to provide a sustainable structure capable of supporting all faculty, students and staff at UF while also molding the diversity and inclusion climate at UF. At the College of Medicine level, our Office of Diversity and Health Equity (ODHE) is led by Campus Diversity Liaison, Dr. Donna Parker. The ODHE's mission, in line with Medical School Admissions Committee (MSAC), is to increase the number of medical students who are ethnic/cultural minorities while advancing and promoting professional development for all students. Our recruitment of URM and those of disadvantage background will utilize the knowledge and experience of the ODHE and MSAC. It will be a team effort among the recruitment director of the MD-PHD program, Dr. Kristianna Fredenburg, the ODHE, and the MSAC Directorate.

(b) Institutional Recruitment Efforts:

We are proud to report our MSAC has increased the percentage of URM and disadvantaged students' enrollment since 2016 to 30% of the UF Medical School Classes who are URM or disadvantaged. We aim to capitalize on this pool of students through program marketing to improve both external and internal recruitment. We would like to increase enrollment of URM MD-PhD Scholars to 20% in the next few years and aspire to 40% URM MD-PHD Scholars as a long-term goal. Examples of marketing efforts include the Directorate's involvement within the interview process with our own presentation about the MD-PhD program during medical student candidate luncheons. Through our recruitment office, we will have an "open door" policy for enrolled students who express an interest and want to discuss the program. Those interested will have an open invitation to our MD-PHD seminars, symposiums, and retreats. Lastly, we will have, at a minimum, an

annual presence at institutional gatherings of traditional URM organizations like SNMA (Student National Medical Association) to discuss the qualifications, opportunities, challenges and rewards of obtaining a combined degree. We will also expand our sponsorship and support for an undergraduate American Physician Scientist Association chapter on our undergraduate campus, one of only three in the U.S. We will refer to the APSA chapter our URM students interested in learning more about a career as a physician-scientist. Collectively, we believe these tools will capture the URM population of our student body and additionally strengthen the culture of our MD-PhD students.

(c) Extramural Recruitment Efforts: Either the MSAC or the MD-PHD Recruitment and Selection Committee may articulate interest in a candidate and promote an invitation for an interview, which will help to ensure that URM MD-PhD candidates are not excluded from the interview process. The UF ODHE and MSAC directorates will have a presence at an extensive list of events within the state of Florida and nationally.

The MD-PHD will build on their presence through recruitment and advertisement efforts which highlight MD-PhD training. Additionally, our MD-PhD program has hired an experienced recruitment officer, Mr. Kenneth Wynn. Over the past 4 years, Mr. Wynn has made successful connections with HBCUs (Historically Black Colleges and Universities) throughout Florida and Georgia. His work has enhanced URM recruitment and retention for the College of Nursing. Mr. Wynn will work alongside Dr. Fredenburg to build a presence for the UF MD-PHD throughout Florida and Georgia. We will also attend national conferences including the Annual Biomedical Research Conference for Minority Students (ABRCMS) and the annual meeting of the Society for Advancement of Hispanics/Chicanos and Native Americans in Science (SACNAS). For these conferences, the MD-PHD Directorate will work with the CTSI Communications and Dissemination Program to develop an advertising and display materials that highlight the scientific success of our MD-PhD trainees, especially our URMs. We will work alongside of the ODHE and MSAC directorates to ensure representation at these meetings in the form of student members and/or recruiting materials which may include PowerPoint presentations and brochures. Based on past surveys of UF HSC program applicants, websites provide the most important recruiting tool. Our website will be one of our key means of providing detailed and accurate information about program features and research opportunities. The CTSI Communications and Dissemination Program also will invest significant effort in updating the MD-PHD website to reflect the expanded career and professional development opportunities and changes.

(d) Other institutional Efforts: Other recruiting efforts will include engaging students in our summer health programs. Our ODHE office participates in the Robert Wood Foundation, American Association of Medical Colleges, and American Dental Education Association funded national Summer Health Professions Education Program (SHPEP). SHPEP is a summer enrichment program focused on improving access to information and resources for URM college sophomores and juniors interested in the health professions. The goals are to strengthen the academic proficiency and career development of students underrepresented in the health professions, and to prepare them for a successful application and matriculation to health professions schools.

UF Health most recently opened the Cancer Research Education and Engagement (CaRE²) Center. CaRE² is a NCI-funded collaborative effort that aims to support research and train URMs interested in health professions. Each summer a large number of qualified URM students from surrounding HBCUs and within UF at the undergraduate to graduate level are supported to perform research and receive career counseling. Dr. Fredenburg is a member of CaRE² and has the opportunity to engage these students. This an excellent opportunity to not only recruit for the MD-PHD, but to also provide career counseling for URMs who are seeking to establish careers in the health sciences.

The UF HSC also collaborates with other UF Colleges and Institutes and federal (e.g. NIH) and private funding agencies to sponsor a number of programs for URM students at different stages of their biomedical career development. These include a campus visitation program, the McKnight Doctoral Fellowship, and McNair Graduate Assistantship Program (held by a current MD-PHD Scholar). UF also currently has a Historically Black College and Universities, UF (HBCU-UF) Masters to PhD Pathway Project, a Bridges to the Directorate (R25) Program, and a MARC Program.

(e) Retention Efforts: Our retention efforts involve developing and maintaining a strong support network for our students, chiefly through faculty mentoring and social wellness. The CTSI Mentor Academy will proactively recruit faculty members from underrepresented groups to serve as mentors, and the CTSI will develop a Personal Roadmap Program for all trainees who are underrepresented minorities. In 2014, the CTSI created

the One Florida Minority Education Program in collaboration with Florida A&M University (FAMU) and Edward Waters College, two HBCUs. The program links junior faculty and graduate students with faculty mentors from UF, the University of Miami, or Florida State University. We will utilize this network, if necessary, to provide additional support for our URM students. Example Plan for retention: Academic performance and research progress will be followed closely by the Directorate via regular progress reports from the mentors, monitoring of academic performance and participation in professional and career development activities, and the annual personal interviews. Close monitoring will allow early intervention if the need arises, which may take advantage of services offered by the UF Dean of Students Office and/or counseling services available at the college and university level. A dedicated student counselor is available in the COM to Scholars seeking guidance on personal, academic, and career issues.

(f)Students with Disabilities and Disadvantaged Backgrounds: The University has prioritized accessibility for students challenged with differing abilities. Through the Disability Resource Center, students and trainees can receive a variety of “Disability Accommodations and Services”, such as: American Sign Language interpreters; Assistive Technology; Assistive Transportation Arrangements; Books on Tape; Classroom Accessibility; diagnostic referrals; distraction-reduced exam sites; enlarged print; FM systems; in-class note-takers; preparation of accommodation requests for postgraduate entrance examinations; readers and scribes; and time extensions for class exams. The University is ADA-compliant, and all spaces used by trainees are accessible. In addition, Dr. Pearson has extensive experience working with Deaf/Hard of Hearing professionals. As the Founding Director of the National Center for Deaf and Health Research, Dr. Pearson’s experience with this population is unmatched and will provide further support, recruitment, and retention of individuals from this background.

Participation of MD-PHD Scholars in the Admissions Process

One or two MD-PHD Scholars will sit on the Directorate/OBRCD as representative of the UF MD-PhD Scholar Council. This will usually be the Chair of the Scholar Council; a Co-chair will also be named so that Scholar representation will not be interrupted by clinical or research responsibilities. This position should turnover annually or biannually. MD-PHD Scholars will host candidates invited to the MD-PHD interview. The MD-PHD Scholars will also have lunch with applicants, providing applicants with an opportunity to talk with several MD-PHD Scholars. Additionally, each applicant will be interviewed by 1-2 MD-PHD scholars.

Scholar Review and Selection

UF COM seeks to attract and retain MD-PhD Scholars who are highly prepared and motivated for roles as physician-scientists. The Admission process involves a holistic review of all applications, recognizing that MD-PhD candidates must be considered with different criteria in the context of their unique career interests. The parallel reviews, interviewing, and selection processes then emphasize regular communication between the MD-PHD Recruitment and Selection Committee (Table 5) and the COM

Table 5: UF MD-PhD Recruitment and Selection Committee

Committee Member	Title
Kristianna Fredenburg, MD, PhD (Chair)	MD-PHD Directorate member, Assistant Professor of Pathology
Alfred Lewin, PhD	Professor of Molecular Genetics and Pediatrics
Elias Sayour, MD, PhD	Assistant Professor of Neurosurgery and Pediatrics
Coy Heldermon, MD, PhD	Assistant Professor of Medicine
Amy Vittor, MD, PhD, MHS	Assistant Professor of Medicine
Nicole Iovine, MD, PhD	Associate Professor of Medicine
Kathryn Hitchcock, MD., PhD	Associate Professor of Radiation Oncology
David Tran, MD, PhD	Chief of the Division of Neuro-Oncology Department of Neurosurgery

Admissions Office. Those applying to the MD-PhD Program are reviewed by both MD reviewer and MD-PhD reviewers. The MD-PHD Directorate have access to applications of all MD-PhD candidates. Either the COM Admissions Office or the MD-PhD Program Recruitment and Selection committee may identify outstanding candidates for a potential interview. Those who meet eligibility criteria from both programs will be invited for an interview. The MD-PHD candidates will be invited in groups of 4-6 candidates on Thursdays between August and February. The MD-PhD Program and its Scholars are responsible for hospitality and programming for the first day. The MD-PHD Recruitment and Selection Committee will complete a holistic assessment of the candidate’s potential as a physician-scientist. The applicant will then join the regular MD applicants for the Friday interview day. Applicants are then evaluated at the Medical School Interview Committee (MSIC) evaluation meeting at which MD-PhD Recruitment and Selection Committee Member will attend and participate in the decision of candidates to recommend for admission. Candidates recommended for admission by the

MSIC are referred to the Medical School Admissions Committee (MSAC). In accordance with LCME accreditation standards, the MSAC (including faculty representation from the MD-PhD Program) make all final decisions on admissions to the medical student class. Faculty members from the Office of Diversity and Health Equity participate as members of MSAC.

Readmission Policy

Students who have left the program prior to graduating and wish to be readmitted require: letters to the COM Admissions Committee and the MD-PHD Directorate requesting consideration of readmission, the reasons for the leave of absence, and a plan for completion of the requirements for the MD, PhD, and MD-PhD degrees. Readmission to the MD, PhD, or MD-PhD Programs is not guaranteed and may depend on availability of stipend and tuition funds available for the years of training which remain.

Admission to UF MD-PHD after MS1-2 Years of UF Medical School

Not infrequently, UF Medical students develop an interest in physician-scientist training, often after learning more about the program, speaking with COM Faculty during the preclinical courses, or a positive research experience during their summer between MS1 and MS2. Medical Students who wish to be considered for a MD-PHD position in GS1 should meet with one of the Directorate to discuss their interest. They would then require the following:

- 1) A letter of application to the Recruitment and Selection Committee, describing the reason for their interest in the MD PhD Program.
- 2) An updated CV
- 3) A plan for GS1-GS4 years of graduate school, including:
 - (a) A letter of support from a mentor or mentoring committee who qualifies as an MD-PHD mentor
 - (b) The PhD Program in which the dissertation would be performed, including discussions with the Program Director
 - (c) Financial plan to support stipend and tuition for GS1-4.

The Recruitment and Selection Committee would then determine if the applicant should be matriculated into the MD-PHD. Admission may also be determined by availability of funds for MS3 and MS4 years.

SCHOLAR SOCIAL SUPPORT

In addition to a formal student mentoring program, the UF MD-PhD program is designed to foster a close-knit supportive community of physician-scientists. The nature and quality of MD-PhD students' interactions with fellow students and mentors are vital to the socialization of students in the community of scholars and in developing confidence and expertise to be successful scientists and clinicians. Having a large group of MD-PhD students who know each other and spend time together helps greatly.

The UF MD PhD Community

To aid in the retention of trainees, their academic performance and research progress will be followed closely by the MD-PHD Directorate via regular review of Individual Development Plans (IDPs) with mentors, monitoring of academic performance and participation in professional and career development activities, and annual personal interviews. Close monitoring will allow early intervention if the need arises, which may take advantage of services offered by the UF HSC Graduate Medical Education Office and/or Counseling and Student Health Services available at the college and university level (see below.) A dedicated student counselor is available in the COM to Scholars seeking guidance on personal and academic and career issues. Two specific forms of support are:

- (a) *Group-specific interventions:* Career-development programs, leadership-training workshops, national networks, and patient-oriented research programs for physician-scientists who may favor clinical over basic science research.
- (b) *Administrative Support:* Career-development and networking activities that help students understand the potential challenges of transitioning, integrating, and reintegrating into the cultures of each phase of training and also foster students' identities as physician-scientists in their field of study. Yearly retreats to specifically address the transitions to and from graduate school, in which faculty within and outside the school were invited as speakers to come in and talk about transitions.

Monthly Evening Meetings with Program Leadership

The monthly meetings are restricted to UF MD-PHD Scholars, Directorate members, and invited faculty. The function of the meetings are: 1) Communication of Program activities, UF MD-PHD Scholar achievements, meeting dates, etc.; 2) Organizational reports from the UF MD-PHD Student Council and its Wellness Committee, NIH Program Office, UF COM and UF Graduate School, etc.; 3) Developmental, with time set aside for workshops for introduction of new MD-PHD programs. Attendance will be required and recorded. Recurrent non-attenders will be counseled to emphasize their participation as key to program effectiveness.

MD-PHD Scholar Council

The MD-PHD Scholars will nominate and elect Scholars to the MD-PHD Scholar Council, which meets at least quarterly. In addition to a Chair and Co-chair, the several phases of the MD-PHD Program are represented, including Medical Student MS1&2, Graduate Students GS 1&2, GS 3-5, and MS 3-4. Each group will have a representative and an alternate. They will meet quarterly with the Directorate to discuss issues of mutual interest. The structure of the council is outlined in Figure 7. The GS 1&2 representative is responsible for meeting with the GS1 and GS2 classes, respectively, to ensure planning of the fall retreat and spring Symposium, respectively, are going smoothly. The APSA (American Physician Scientists Association) IR (institutional representative) serves as the liaison between UF MD-PHD and APSA National, ensuring that relevant resources and events (e.g. webinars about resilience or PSTPs) are made known to scholars. The APSA IR also serves as the liaison with the undergraduate APSA club on campus, facilitating crosstalk and potential mentor-mentee relationships in an effort to bolster the physician-scientist culture on campus.

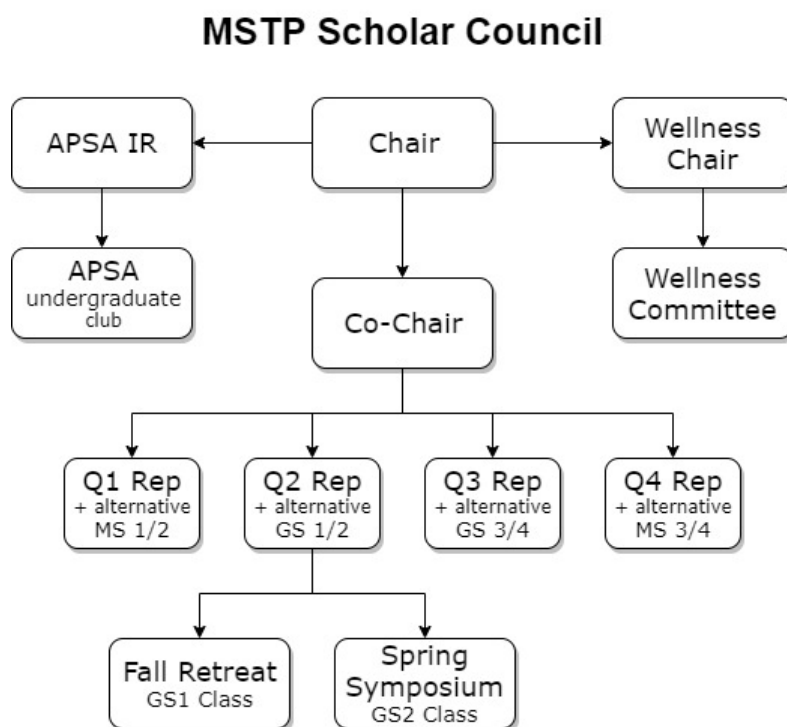


Figure 6. Organizational Chart for the MD-PHD Scholar Council

MD-PHD Wellness Committee

The Wellness Committee is a subcommittee of the MD-PHD Scholar Council. Under the leadership of the Wellness Chair, these scholars foster camaraderie between students within our program. Students have emphasized the importance of their gatherings to the Directorate. With financial support from the Program Directorate, the students plan and coordinate all events. Wellness events are designed by a committee of scholars from the UF MD-PHD Scholar Council to promote camaraderie, peer support, and long-lasting relationships between scholars. An effective social support system will help to mitigate the difficulty of transitions between medical and graduate training. The Wellness Committee also plans second-look events for accepted MD-PHD scholars who wish to visit UF a second time.

GRADUATE STUDENT LOUNGE

The lounge, located on the ground floor of the Communicore Building, provides graduate students from all six of UF's health science colleges with a comfortable space to interact and take a break from their busy schedules. Graduate students helped design the space, which features natural light and includes three Apple TVs, two refrigerators, and two microwaves. The lounge provides a needed escape for students who can spend up to 14 hours a day working in the lab. Entry by UF ID number is required. See Figure 6.

MD-PHD OFFICES IN THE OBRCD

The OBRCD has offices for each UF MD-PHD Coordinator and the Data Manager. The MD-PHD Scholars will have access to conference rooms or offices as needed for their activities. See Figure 6.

COUNSELING AND STUDENT HEALTH SERVICES

Students may occasionally have personal issues that arise in the course of pursuing higher education or that may interfere with their academic performance. If you find yourself facing problems affecting your coursework, you are encouraged to talk with an instructor and to seek confidential assistance at:

[University of Florida Counseling & Wellness Center](#), 352-392-1575 Visit their website for more information.

U Matter, We Care, umatter@ufl.edu, 352-392-1575

Crisis intervention is always available 24/7 from: [Alachua County Crisis Center](#): (352) 264-6789

BUT – Do not wait until you reach a crisis to talk with a counselor. The University of Florida Counseling Center has helped many students through stressful situations impacting their academic performance; you are not alone so do not be afraid to ask for assistance.

The [Student Health Care Center at Shands](#) is a satellite clinic of the [main Student Health Care Center](#) located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services including primary care, women's health care, immunizations, and pharmacy services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 352-294-5700 or visit the website.

It is the goal of the [Disability Resource Center](#) to foster a sense of empowerment in students with disabilities by educating them about their legal rights and responsibilities so that they can make informed choices, by encouraging them to engage in critical thinking and self-advocacy and by supporting them in being successful students, campus leaders and positive contributors to the campus community. The Disability Resource Center, in conjunction with the Division of Student Affairs, is helping students to create an unparalleled experience where students embrace learning and diversity to become leaders in the service of the global community.

FINANCIAL ISSUES

Stipends and Tuition

The MD-PhD Training Program offers a full stipend scholarship and tuition waiver for up to 8 new students each year for the entire period of their training. During the graduate portion of the training, MD-PhD students are appointed as Graduate Research Assistants and receive tuition remission and a stipend per year according to the policies of the PhD Program (and program concentration, where applicable). The stipend and tuition remission may be funded by the mentor's research grant, an NIH training grant, or other institutional funds.

Fellowship funded (F-30 or pre-doctoral) students are required to take 12 credits in fall, spring and 8 in the summer. Graduate Assistants are required to take 9 credits in fall, spring and 6 in the summer. Three to four years are usually required to undertake and complete a PhD program. Thus, MD-PhD students typically require seven to eight years to obtain their combined degree. The dissertation Supervisory Committee is selected by the student and mentor and plays a major role in setting the academic requirements for the PhD

degree beyond those stipulated by the Graduate School. The Committee determines specific course requirements, administers the written and oral qualifying exam, and decides when the student graduates. Most importantly, the Committee provides research and career advice throughout the period of graduate education. At least one representative of the MD-PhD Program must be a member of each student's Dissertation Committee.

Health Insurance

MD-PhD students are also eligible for free graduate student health insurance during their PhD training. Students must have coverage all years of training, including time in the research laboratory. Health insurance must provide coverage for all internal and external training sites. The following links provide valuable information to student health.

- Immunization Policy: UF requires that all new students show proof of immunizations before attending UF, <http://shcc.ufl.edu/services/primary-care/immunizations/>.
- Student Health Care Center: UF provides a variety of care to students, partners, and spouses. Specific information can be found on their website, <http://shcc.ufl.edu/>.
- Needle Stick Hotline Program: UF's dedicated phone line provides immediate access to trained provider. Students should call 1-866-477-6824 (OUCH), or can access the website for additional information, <http://osa.med.ufl.edu/about/needle-stick-hotlineprogram/>. When in doubt, go directly to the nearest emergency room.
- Under most circumstances, students who have the UF Health Insurance plan must initially seek care through their assigned primary care provider. However, no referral is required when the student seeks obstetric or gynecologic care. If you have difficulty arranging for this type of medical care, please contact Ms. Kaitlin Lindsey (273-4550).
- U Matter, We Care: At UF Every Gator Counts. U Matter, We Care serves as UF's umbrella program for UF's caring culture and provides students in distress with support and coordination of the wide variety of appropriate resources. Families, faculty and students can contact <http://www.umatter.ufl.edu/> seven days a week for assistance for students in distress

Fees

During the graduate school years, some MD-PhD students appointed as Graduate Research Assistants have been paying for student fees out-of-pocket, whereas others have had student fees paid by their mentor's research grants or other department funds. We wish to have a uniform policy so we do not have some students paying out-of-pocket and others not. Effective immediately with the spring 2020 semester:

1. If the mentor or home department of the MD-PhD student is in the practice of paying for GRA student fees from grants or any other sources for other PhD students, student fees for the MD-student PhD should covered the same way.
2. For MD-PhD students with mentors in other departments, IN-STATE student fees will be covered by the MD-PhD program as a scholarship from the COM.

As a reminder, all out-of-state MD-PhD students are expected to file the Declaration of Domicile and other paperwork with the city of Gainesville during their first year at UF to become reclassified as in-state for tuition purposes. The MD-PhD program will only pay for tuition and fees at the IN-STATE rate beyond the first year of medical school.

MD-PhD students appointed as Pre-doctoral Fellows during the graduate school years will continue having student fees covered according to the relevant NIH individual fellowship (F30 or F31) or NIH training grant (T32 or TL1) award budget. This is typically 60% covered by the training grant or fellowship and 40% covered by some other institutional source.

Taxation of Stipends/Tuition: Policy under review.

Travel Funds

The UF MD-PHD has limited funds budgeted for research-related travel each year. It is recognized that an important aspect of the GS1-4 and MS3-4 years is the attendance at national research meetings for learning about a potential field for a career and the presentation of dissertation research. Requests for travel funds should be made to Wanda Aviles, MD-PHD Coordinator, in letter form describing the nature of the educational/research program that will require travel funds, an estimate of the funds requested, and the date of the travel which will require early purchase of less expensive airline and hotel reservations. In general, domestic travel will be supported. Special requests for international travel will be considered, but often are much more expensive and less prestigious than domestic meetings. Students may also be supported by their laboratories in which they work, the TL1 Program, F30 and F31 grants, and travel awards given to students by meetings and societies.

ACADEMIC PROFESSIONALISM AND INTEGRITY

In addition to prescribed coursework in the program, students are required to collaborate with their mentors and other faculty members on presentations at professional meetings, publications in peer-reviewed journals, and professional service, such as reviewing journal articles, consulting with community agencies, and serving on University and Department committees. Professional communication and behavior are expected of all students in the program. Students are strongly urged to participate in service activities, including community service, service on Department or University committees or organizations, or service within professional organizations. Professionalism is an educational outcome of this program and therefore, is continually assessed by the research mentors and other faculty members based on student behaviors and interactions in the department and class. Professional behaviors and attitudes are also assessed during the yearly departmental assessments done by the Department Chair and Program Director and can negatively impact academic standing and eventual readiness for graduation.

Research Integrity

All students are responsible for receiving ongoing training in the Responsible Conduct of Research. This training should begin in the first 30 days of the program; ignorance of federal regulations covering research is not an excuse for misconduct. Graduate students can be and are held accountable for their conduct, and such accountability can lead to serious consequences. To meet this training need, students are required to take the course on Responsible Conduct of Research and a Course on Rigor and Reproducibility of Research, usually during GS1. Students should also expect regular discussion of expected conduct with their mentors. The University has an [Office of Research](#) and Research Compliance Officer. Become familiar with the information on their website. Students are responsible for reading and understanding this policy before engaging in any research activities:

UF Research Misconduct Policy.

"It is the policy of the University that each individual faculty, staff member and student is expected to maintain high ethical standards in the conduct and reporting of his/her scientific and scholarly research. Faculty, staff, and students have responsibilities for ethical conduct in research not only to the University, but also to the community at large, to the academic community, and to private and public institutions sponsoring the research activities. Research Misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research or reporting the results. It does not include honest error or honest differences in interpretations or judgments of data. It also does not include authorship or credit disputes. Should alleged incidents of misconduct in research occur, reporting of such possible violations is a shared responsibility, and it is the duty of the faculty, staff members and students to respond in a fitting manner to resolve issues arising from such alleged misconduct. Such an allegation should be brought to the administrative officer to whom the accused reports (e.g., supervisor, department chair, dean or director). The procedures for reporting misconduct may vary depending on the type, seriousness, and technical nature of the alleged misconduct."

In addition to the administrative officer to whom the accused reports, academic and research misconduct will be reported to any persons who have a legitimate educational need to know about the issue. This may include the Department Chair, the MD PhD or PhD Program Director, members of the dissertation committee and other faculty members.

If you have any concerns about conduct, please see your Research Mentor or the PhD Program Director to clarify the UF policy and to consider possible action.

Student Honor Code

All students are required to abide by the [Student Honor Code](#). In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action.

On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied:

On my honor, I have neither given nor received unauthorized aid in doing this assignment.

MD-PHD PROGRAM EVALUATION AND DATA COLLECTION

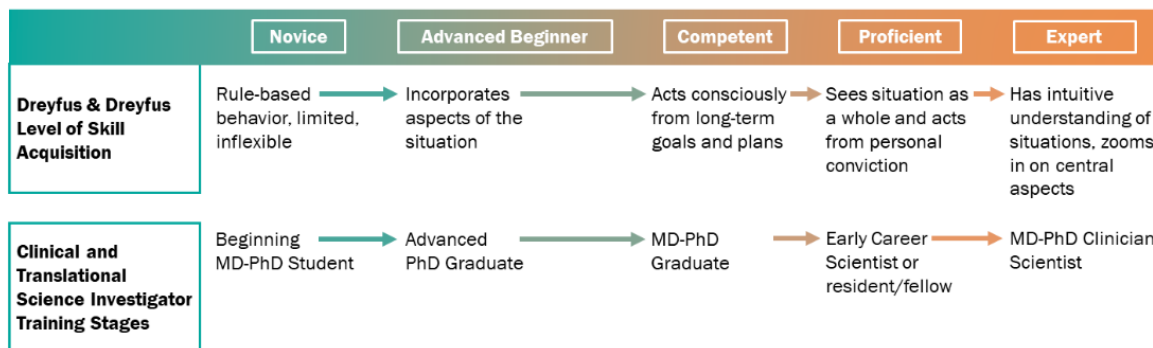
The quality of the training program, including instruction, mentoring, and trainee experiences, will be assessed using a variety of formative and summative measures. In order to identify the factors that associated with success and improve outcomes of future trainees, our evaluation approach will: 1) assess the overall impact of program effectiveness and progress toward increasing the number and diversity of clinician scientists; 2) determine the contribution of program elements toward achieving program outcomes; and 3) identify program changes/adjustments to improve program outcomes, as needed. The MD-PHD Logic Model illustrates the logical relationships among the MD-PHD motivating factors, training objectives, available resources, training activities and programs, and the short-term outputs and long-term outcomes of the MD-PHD Program that will lead to achievement of programmatic objectives and impact goals. Understanding these alignments with programmatic premises is key to developing a program evaluation plan and selecting assessment metrics in this Logic Model. (Figure 8)

Program Component		Assessment Foci	Data Sources and Methods
Process Evaluation	Trainees Mentors Program components Institutional resources	Diversity (at trainee, mentor, and program offering level) Mentor/trainee alignment Plan/implementation alignment	Record review for demographics, academic records and CVs, research and clinical focus, program curricula, IDPs, and trainee access to institutional resources
	Trainee-level activities	Experiential learning Collaborative scholarship	
	Program structure activities	Training program support Career development	
	Environment/culture activities	Academic and professional development Diversity and inclusion	
Short- and Long-Term Outcome Evaluation	Outputs (short-term)	Academic performance Competency development Scholar development infrastructure Professional networking Attitude and mindset development Training Environment	<ul style="list-style-type: none"> -Record review for demographic, academic record, IDP goals and progress, research and clinical focus, and program offerings -Surveys using CRAI, Mentoring Quality, and professional network instruments -Focus group/interviews with trainees and mentors to assess training process, professional development curriculum, resource utilization, training culture, academic development, and leadership and future career orientation
	Outcomes (long-term)	Research design, conduct, and dissemination skills Physician scientist orientation, motivation, and leadership Mentoring and career development engagement Cultural and scientific diversity intelligence Collaboration skills and environment Readiness and progress toward physician scientist career	

Figure 8: Abbreviated Logic Model

Data collection and analysis are overseen by Educational Development & Evaluation Working Group led by Yulia A. Strekalova, PhD. Data from Scholar and faculty are being collected related to 1) participant

background, 2) participant mentors, 3) facilitation of learning and career development, 4) outcomes related to competencies (e.g., knowledge, skills, and awareness of career tracks), and 5) formative feedback for use in program improvement and for helping faculty achieve a successful program outcome. Surveys will be conducted during the first semester after matriculation to establish a baseline for each Scholar, upon major program transitions (MS2 to GS1 and GS4 to MS3), upon graduation, and one, three, and five years beyond graduation to assess the effectiveness of the faculty, satisfaction with the program, and Scholar perceptions of the impact of the program on their residency/job placement and career trajectory. Suggestions for improving the program are solicited and are being used for program improvement.



Trainee-level assessment plan.

Assessment of trainees' success has been adapted from the conceptual model proposed for academic competency and efficacy and for measuring career success of physician scientists. Following these models, domains of training success are defined to include success factors (e.g., earned degrees, job placement, grants, and publications) and intrinsic success factors (e.g., job, career, and life satisfaction). In addition, learner competencies, defined as a combination of knowledge, skills, and attitudes required to perform specific tasks at specific levels of proficiency and efficacy, and set in the context of professional practice, will also be addressed. While unique training outcomes for MD-PhD programs are underdeveloped in the academic literature, the application of competency-based assessment that has been used for many years in the private and public sectors to identify capabilities can provide insights into both individual and organizational performance. The advantages of competency-based assessment include individualization of assessment, the ability to respond more quickly if the need for remediation arises, flexibility to allocate resources to learners most in need, and evidence of quality from rigorous assessment. This method provides focus on learning outcomes rather than processes of education and training.

Programmatic support and structure evaluation plan

The quality of the MD-PHD training program structure, professional and leadership development curriculum, mentoring, and trainee experiences will be assessed using a variety of formative and summative measures. Determinants of training success that can be tracked include both personal factors (e.g., demographics, prior experience) and organizational factors (e.g., institutional resources, mentoring, training programs). Assessment methods and metrics will be used at selected stages of training (typically beginning, middle, and end) to assess changes in personal factors, knowledge, skills, and attitudes over time. Personal factors, such as self-efficacy, are often overlooked, however they may predict research productivity. The program factors that we are focusing on include mentoring and networking. Mentoring is being assessed using focus group interviews. For the networking measure, we will use the Research Orientation Scale, which measures researcher preference for unidisciplinary, multidisciplinary or interdisciplinary research.

Program Environment and Culture Evaluation

One of the goals of the MD-PHD programs is to increase the number of URM scholars that pursue physician scientist careers. The second goal is to provide an environment of leadership development for the scholars. The evaluation of activities, outputs and outcomes is aligned across these goals and will be based on program records and scholar- and mentor-provided evaluations. Specifically, the data from recruitment records, CV review, and scholar and mentor interviews will be triangulated and analyzed with the focus on recruitment strategies and efforts, scholar matriculation, leadership curriculum, and participation in research, clinical, and service leadership roles.

Training Outcomes of Scholars since 2007

As previously mentioned, the funding of stipends and tuition for UF MD-PhD scholars was formally organized in 2007, so the Scholars' training outcomes relevant to the current UF MD-PHD are limited to these last twelve years. However, for Tables 6, 7 and 8, the data from pre-2007 matriculants are shown for completeness, which clearly identifies the older program of having a different organization and few incentives to continue in MD and PhD training.

Table 6: Matriculants to UF MD-PhD Training Program Prior to 2007 and 2007-2018

Matriculants	Total	URM	Earned MD-PhD	Earned MD only	Earned PhD only	Earned MS only	Dropped Out	In training MD-PhD	In training MD only
Pre-2007	76	4 (5%)	51 (67%)	21 (28%)	2 (3%)	1 (1%)	1 (1%)	0	0
2007-2018	60	5 (9%)	15 (25%)	1 (2%) ^a	0	0	1 (2%) ^b	38 (63%)	5 (8%) ^c

^aDropped PhD in favor of clinical work after G1.
^bDropped out of medical school for medical reasons after G1.
^cTwo dropped PhD in favor of clinical work (one after M2 and one after G1), one dropped PhD for family reasons (after M1), and two are pursuing a PhD at other institutions.

Scholars Matriculating Since 2007

Since 2007, 15 students have graduated with the MD-PhD degree and one completed the MD only (dropped PhD after G1 in favor of clinical work) (Table 7). The 15 MD-PhD graduates had an average of four first-author publications (range 0-9), with an average of eight total publications (range 3-15). Prior to 2007 the average time-to-degree (TTD) was 4.3 years for the PhD and 7.7 years for the combined MD-PhD degree. Since 2009 the average TTD has been 3.7 years for the PhD and 7.5 years overall.

Table 7: Graduates for UF MD-PhD Training Program Prior to 2007 and 2007-2018

Graduates	Total	Degrees Earned				Time-To-Degree (yrs.)		Publications		Extramural Support		
		MD-PhD	MD only	PhD only	MS only	PhD	MD-PhD	First-Author	All	F	T32	TL1
Pre-2007	75	51(67%)	21(28%)	2 (3%)	1 (1%)	4.3	7.7	nd ^a	nd	5	nd	na ^b
2007-2018	16	15(94%)	1 (6%)	0	0	3.7	7.5	3.9 (0-9)	8.4 (3-15)	12	8	9

^aNo historical data available.
^bNot applicable, as TL1 started in 2009.

Evidence for Scholar's Research Performance

The graduates have an average of 3.9 first authored papers (0-9 range) and 8.4 total publications (range 3-15). No Scholars failed to publish. The number of graduating scholars with external support during their GS and MS3-4 years is impressive, with 12 of 16 scholars securing NIH Awards, including 8 supported by T32 awards, 9 supported by TL1 awards, and 10 supported by NIH Fellowship (F) Award. Several Scholars had funding from more than one federal source. Table 8 Scholars with project number, date of award, and title of 10 F30 awards to date.

Table 8: F30 awards for UF MD-PhD Scholars since 2015

Name	Project Number	Date	Title
Wegman, Martin	5F30MH105153-02	01-Feb-15	Comparative effect of managed care on quality and costs of care for Medicaid adults
Newby, Brittney	1F30DK105788-01A1	16-May-15	Type 1 IFN in Type 1 Diabetes: Influencing Beta-Cell and CD8+ T cell interactions
Holden, David	1F30GM119285-01	16-May-16	In pursuit of a PICS prognostic: An investigation of the agents activating and perpetuating PICS.
Massengill, Michael	1F30EY027163-01	16-Aug-16	Development of Allele Independent Gene Therapy Strategies for Autosomal Dominant Retinitis Pigmentosa
Dyson, Kyle	1F30CA221345-01	1-Sep-17	Immunologic Targeting of Developmentally-Regulated Antigens for the Treatment of High-Risk Medulloblastoma
Futch, Hunter	1F30NS105408-01	22-Sep-17	Immunotherapeutic Targeting of Corticotropin-Releasing Hormone in Alzheimer's Disease
Grippin, Adam	1F30CA228280-01	16-May-18	Engineering RNA-nanoparticles to enhance dendritic cell mediated treatment of glioblastoma
Sebastian, Mathew	1F30CA232641-01	16-Aug-18	Pglyrp3 cooperates with Snail1 to mediate anti-tumor immune response in breast cancer
Sorrentino, Zachary	AG063446-01	1-May-19	Towards Understanding the Initiating Role of Truncated Alpha-Synuclein in Neurodegeneration
Hsiao, Chu	P0121566	16-May-19	Biocultural investigation of maternal adversity on gene expression and DNA methylation in the placenta

(d)Postgraduate Training and Career Paths

A total of 16 UF MD-PHD Scholars have graduated and have entered residencies at postgraduate training programs. All graduates, including the class of 2019, are currently in training programs in highly regarded

academic health centers in the U.S. None failed to secure a residency position. Post-training careers have not yet been initiated for our UF MD-PHD graduates. As there is no long-range follow-up, we have no data about biomedical careers, leadership, clinical research, etc., but will collect these data from at least 15 years after graduation.

APPENDIX: RESOURCES FOR MD-PHD SCHOLARS

UF Directorate Contact Information:

Role	Name	Address	Telephone	Email
Director	Thomas Pearson, MD, PhD, MPH	CTRB 4210	352-273-5048	tapearson@ufl.edu
Admin Specialist	Mary Gipson	CTRB 4209	352-294-5957	mary.gipson@ufl.edu
Co-Director	Kristianna Fredenburg, MD, PhD		(352) 672-9240	kfredenburg@ufl.edu
Co-Director	Wayne McCormack, PhD	CG-72 K	352-294-8334	mccormac@pathology.ufl.edu
Co-Director	Ali Zarrinpar, MD, PhD		352-265-0535	ali.Zarrinpar@surgery.ufl.edu
Coordinator	Wanda Aviles	CG-72 E	352-294-8479	waviles@ufl.edu
Coordinator	Kenneth Wynn	CG-72 D	352-294-8336	kanh26@ufl.edu
Evaluator	Yulia Strekalova, PhD	GC-72 C	352-294-8333	yulias@ufl.edu
Data Manager	Audrey Natwick	CG-72 J	352-294-8332	a.dickinson@ufl.edu

UF CTSI Facilities and other Resources

UF MD-PhD Resources Guide

Learn, Discover, Lead Syllabus for 24 Month Cycle of Professional Skill Building Workshops

Date	Session Title	Presenter
9/13/19	The Art (and Science) of Writing Effective Multiple Choice Questions	W. Patrick Duff, MD, Professor and Associate Dean for Student Affairs, COM
10/11/19	Effective Science Communication in the Internet Age	Kevin Folta, PhD, Professor, Horticultural Sciences, IFAS
11/8/19	Project Management	Jenny Seitz, MEd, Training System Administrator, UF Training & Organizational Development
12/13/19	Team Dynamics and Leading Teams	Wayne T. McCormack, PhD, Director, Office of Biomedical Research Career Development
1/10/20	Mentoring Across Diversity	Jeremy A. Magruder Waisome, PhD, iAAMCS Project Manager, UF Dept. of Computer & Information Science & Engineering
2/14/20	Leadership in Science	Julie A. Johnson, PharmD, Dean & Distinguished Professor, UF College of Pharmacy
3/13/20	Intellectual Property – Where Science Meets Business	Anita Rao, Assistant Director, Licensing Officer, UF Innovate
4/10/20	Communication and Conflict Management	Jade Williams, PhD, Lecturer, UF Dial Center for Written and Oral Communication
5/8/20	University Structure & Planning for Promotion	Mark S. Segal, MD, PhD, Senior Associate Dean for Faculty Affairs & Professional Development, UF College of Medicine
6/12/20	Collaboration Plans: A Secret to Success for Collaboration	Wayne T. McCormack, PhD, Director, Office of Biomedical Research Career Development

Individual Development Plan for UF MD-PhD Scholars

Checklist of MD-PhD Milestones by Training Period (attached).

UF MSTP INDIVIDUAL DEVELOPMENT PLAN

Student Name	_____	Academic Year	_____
MSTP Advisor	_____	MSTP Year	_____
Clinical/Academic Advisor	_____	Graduate Program	_____

Why Create an Individual Development Plan?

An individual development plan (IDP) helps you to align your personal and professional goals with your academic expectations and responsibilities. Developing a plan will give you critical information for building the skills, knowledge, and resources necessary to for your career, and to prepare you for meaningful personal or professional opportunities after graduation.

The template is comprised of a self-assessment of your current skills and interests, a summary of your goals for the upcoming year based on your self-assessment, and an action plan to shape your skillset, created in conjunction with an MSTP director and/or your academic advisor.

How Will an IDP Guide My Progress?

Your IDP will serve as a guide to your annual progress meetings with an MSTP director and/or your academic advisor, to ensure progress is made towards your personal and professional goals. Each year, you should develop a revised IDP, based on an updated assessment of your goals and skills, as well as the progress you make throughout your career, to create attainable steps for fulfilling long-term goals.

Please take the time to complete the IDP template to the best of your ability soon after you arrive at UF and start your MSTP training. It's ok if you are unable to provide clear answers on parts of the IDP template; the document is meant to guide you in formulating a plan for your future, and any questions that arise can be addressed in your first meeting with your advisor. Also, schedule a meeting with an MSTP director in the beginning of your training at UF, to discuss your goals and expectations for your time at UF.

The IDP document is meant to complement the creation of your academic plan of study, which will outline the measures for academic success in your program. MSTP Milestone Calendar attached to this IDP template is another useful reference that you can use to track your progress. To ensure that both the IDP and your plan of study are coordinated, students and advisors each have a set of expectations, which are listed below, to support your progress towards your MD-PhD degree:

EXPECTATIONS

Trainee

- Take primary responsibility for the successful completion of my degree.
- Meet regularly with an MSTP director or my advisor and provide her/him with updates on the progress and results of my activities.
- Establish a shared understanding of satisfactory progress with my advisor.
- Actively seek out advice and feedback from the MSTP directors, my advisor, committee, and other mentors.
- Remain informed of the policies and requirements of my graduate program, and the University of Florida.
- Attend and participate in the MSTP program meetings and seminars.
- Be a good physician scientist collaborator, maintaining a safe and collegial academic and work environment.
- Discuss policies on work hours, sick leave, and vacation with an MSTP director and my advisor.
- Discuss expectations on authorship and attendance at professional meetings with my advisor.

Advisor

- Be committed to a student's education and training as a future member of the physician scientist community.
- Be committed to guiding a trainee's clinical skills or research project development, allowing them to take ownership of their research.
- Encourage students to set reasonable goals and establish a timeline for completion.
- Provide and seek regular and honest feedback on an ongoing basis.
- Commit to improving as a mentor.
- Be open to students by encouraging them to bring concerns to you, while aiming to find acceptable solutions for all concerned.
- Lead by example and facilitate training in complementary skills needed to for a successful career, such as communication, writing, management, and ethical behavior.
- Discuss authorship policies, acknowledge a student's research contributions, and work with students to aid in publishing their work in a timely manner prior to their graduation.

UF MSTP INDIVIDUAL DEVELOPMENT PLAN

PHYSICIAN-SCIENTIST TRAINING OVERVIEW

Briefly describe the status of your **research**, progress made, skills learned, and projects initiated/undertaken.

Briefly describe the progress of your **clinical** training experiences and skills learned.

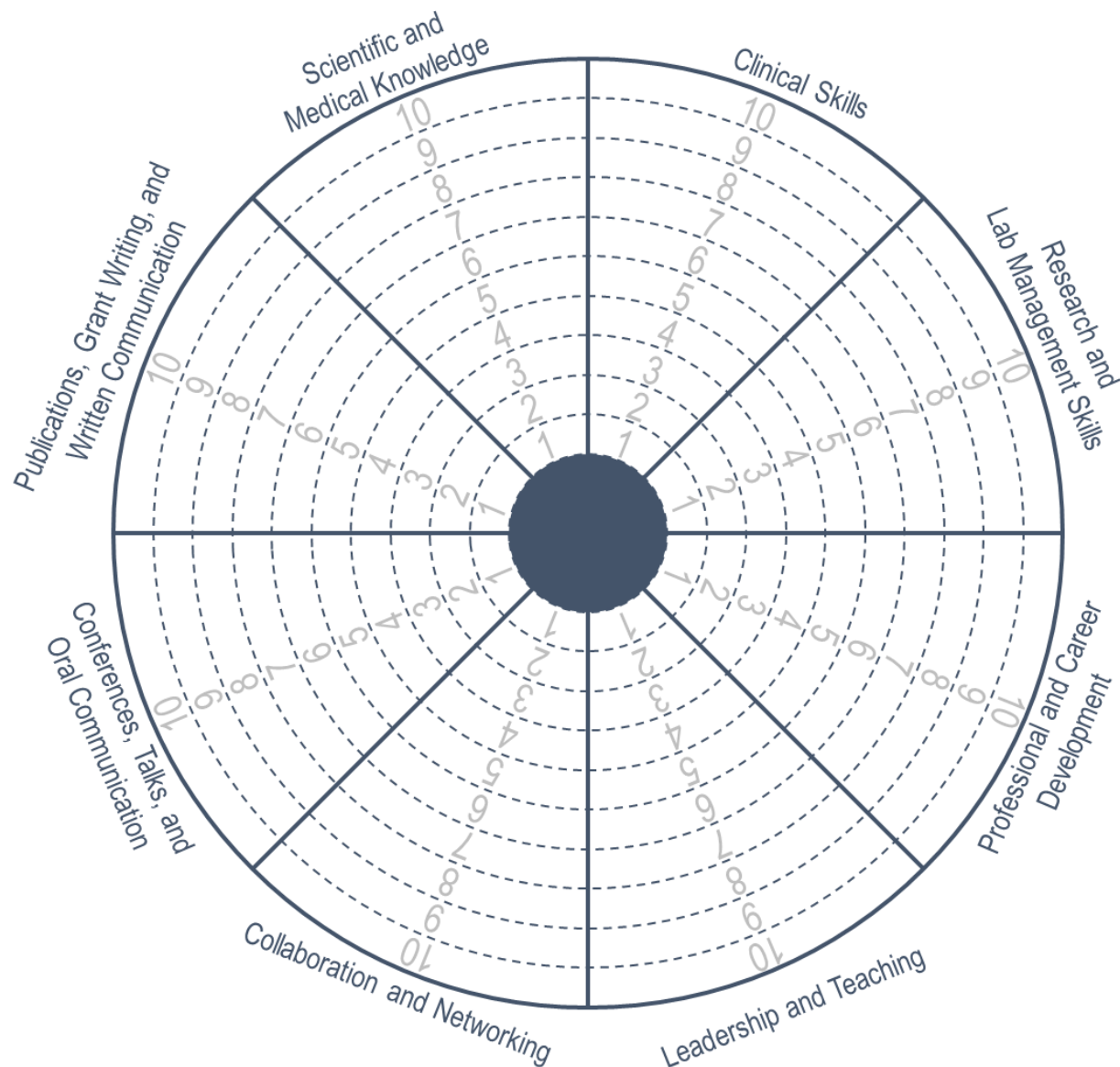
Briefly describe the opportunities for the development of your **leadership** and mentoring skills that you have encountered in the last year.

UF MSTP INDIVIDUAL DEVELOPMENT PLAN

UF MSTP INDIVIDUAL DEVELOPMENT PLAN

SELF-ASSESSMENT

Please use the wheel below to evaluate how satisfied you are with your progress given your training stage, where 1 = completely dissatisfied, and 10 = completely satisfied.



What areas do you see as your key strengths?

What areas need improvement?

UF MSTP INDIVIDUAL DEVELOPMENT PLAN

DEVELOPMENT GOALS

What specific goals do you have for the next academic year, and what specific and measurable actions can you take to achieve them?

Discuss your self-assessment summary and existing goals with an MSTP director or your advisor. Develop an action plan based on this conversation, to address your target goals, skills, and competencies for the next 12 months. Write this plan together, with the aim of updating and revising it as you make academic and personal progress during your graduate career.

Start by identifying an area for development from the list below. Next, formulate an annual goal and list specific actions you plan to take to accomplish the goal.

- ☐ Scientific and Medical Knowledge
- ☐ Clinical Skills
- ☐ Research and Lab Management Skills
- ☐ Publications, Grant Writing, and Written Communication
- ☐ Conferences, Talks, and Oral Communication Skills
- ☐ Collaboration and Networking
- ☐ Leadership, Teaching and Peer Mentoring
- ☐ Academic and Career Development

[illegible]

UF MSTP INDIVIDUAL DEVELOPMENT PLAN

Area:		
Goal	Actions: 1. 2. 3.	Mentor feedback
Area:		
Goal	Actions: 1. 2. 3.	Mentor feedback
Area:		
Goal	Actions: 1. 2. 3.	Mentor feedback
Area:		
Goal	Actions: 1. 2. 3.	Mentor feedback
Area:		
Goal	Actions: 1. 2. 3.	Mentor feedback
Area:		
Goal	Actions: 1. 2. 3.	Mentor feedback

Goal Priority

Please review the goals you have listed and assess them in the order of priority and implementation timeline.

Near term (*within next 6 months*)

Long term (*more than 6 months away*)

High
Priority

Low
Priority

UF MSTP INDIVIDUAL DEVELOPMENT PLAN

YEAR-END PROGRESS ASSESSMENT

Implement your plan by discussing your goals with your mentors, enlisting the assistance of your mentors in the implementation, and periodically reviewing your progress.

Describe your level of satisfaction with your progress over the past year.

What specific challenges (if any) did you face this year and how did they affect your progress?

What further training or academic development support do you feel you need in order to be successful in your goal to become a physician-scientist?

LONG-TERM GOALS

What are your goals for this training program?

What are your residency/post-graduation goals?

What are your long-term (post residency/fellowship) goals?

UF MSTP INDIVIDUAL DEVELOPMENT PLAN

ATTACHMENTS

- ☐ Section of the UF MSTP Milestones checklist for your year of training
- ☐ Updated NIH Bio
- ☐ Research Statement
- ☐ Clinical Statement

At your Annual Progress meeting, please be prepared to discuss the following:

- Are you satisfied with your progress this year and the mentoring you have received? What could be improved this coming year?
- How can the MSTP, your research mentor(s), your clinical mentor(s), and/or your thesis committee help you address any challenges and achieve your goals for the coming year?
- Are you seeking additional faculty members who might help you achieve your goals?

Would you like the MSTP Directorate to provide a copy of this Annual IDP Progress Report to your academic advisor or clinical mentor?

Yes

No

Review and Revise your IDP

As you implement your IDP, remember to adjust your plans as your circumstances change. If necessary, meet with your advisor throughout the year, to discuss your progress and your achievements. Be sure to verify that your annual meeting with your advisor has been scheduled, and that previous meetings have been noted on your student record in GIMS.

Your name/signature:

Today's date:

MSTP Director's name/signature:

Today's date:

2020-21 UF MD-PHD PROGRAM MILESTONES (YEARS 1-8)

Summer before MS1 – Vacation must be taken before starting program.

Milestone	Deadline
<input type="checkbox"/> Attend Orientation Session	July 13-27
<input type="checkbox"/> Complete Introduction to Clinical and Translational Science	July 13-27
<input type="checkbox"/> Clinical Research Practicum Planning and Topic Identification	July 13-27
<input type="checkbox"/> Leadership Curriculum and Research Leadership Workshop	July 14-15
<input type="checkbox"/> Research Certifications <ul style="list-style-type: none"> <input type="checkbox"/> IRB <input type="checkbox"/> HIPAA <input type="checkbox"/> Good Clinical Practice (GCP) 	July 10-17
<input type="checkbox"/> Orientation to MD Program, COM	July 27-31
<input type="checkbox"/> Assignment of Preclinical Advisor, COM	August
<input type="checkbox"/> Meeting with MD-PhD Faculty Advisor	July

MS1 (Year 1)

Milestone	Deadline
<input type="checkbox"/> Selection of Practicum Topic	October
<input type="checkbox"/> Practicum Study IRB Approval, Funding, Initiation	December
<input type="checkbox"/> White Coat Ceremony	November
<input type="checkbox"/> Meet with Directors to discuss programs and three laboratory rotations	February
<input type="checkbox"/> Rotation identification for upcoming summer	February
<input type="checkbox"/> Clinical experience at Equal Access Clinic	May
Required Courses and Events <ul style="list-style-type: none"> <input type="checkbox"/> Monthly educational dinners <input type="checkbox"/> Medical Student Courses <input type="checkbox"/> DIBS Sessions <input type="checkbox"/> Fall Retreat <input type="checkbox"/> Spring Symposium 	Ongoing Ongoing Aug.-Dec. / Jan.-Jun. October May

2020-21 UF MD-PHD PROGRAM MILESTONES (YEARS 1-8)

Summer Between MS1 and MS2	
Milestone	Deadline
<input type="checkbox"/> Two or three laboratory rotations with mentors as potential dissertation chairs	August
<input type="checkbox"/> Work on Practicum Project	Ongoing
<input type="checkbox"/> Complete IACUC if appropriate <input type="checkbox"/> Clinical Experiences at Equal Access Clinic	August Ongoing
Required Courses and Events <input type="checkbox"/> Rigor and Reproducibility (also taken in summer after Year II) <input type="checkbox"/> Responsible Conduct of Research (also taken in summer after Year II)	Ongoing
Note: Vacation scheduled around rotations.	June–July

MS2 (Year 2)	
Milestone	Deadline
<input type="checkbox"/> Preclinical advisor meeting	Fall
<input type="checkbox"/> Continue work on Practicum Project	Ongoing
<input type="checkbox"/> Clinical experience at Equal Access Clinic	Ongoing
<input type="checkbox"/> Meet with Director to select laboratory and mentor, identify funding	February
<input type="checkbox"/> Select Clinical Clerkship last quarter of Year 2	March
<input type="checkbox"/> Preparation for Step I Examination	March
Required Courses and Events <input type="checkbox"/> Medical School courses <input type="checkbox"/> DIBS curriculum <input type="checkbox"/> Fall Retreat <input type="checkbox"/> Spring Symposium	Ongoing Aug.-Dec. / Jan.-Mar. October May

Summer Between MS2 and GS1

2020-21 UF MD-PHD PROGRAM MILESTONES (YEARS 1-8)

Milestone	Deadline
<input type="checkbox"/> Complete data collection on Practicum Project	September
<input type="checkbox"/> Clinical experience at Equal Access Clinic	Ongoing
<input type="checkbox"/> Responsible Conduct of Research	August
<input type="checkbox"/> Rigor and Reproducibility	August
<input type="checkbox"/> Entering Research Workshop	August
<input type="checkbox"/> Meeting with Mentor; Orientation to Laboratory	August
Note: Vacation is taken prior to beginning of Fall Semester	

GS1 (Year 3)	
Milestone	Deadline
<input type="checkbox"/> Mentored Research	Ongoing
<input type="checkbox"/> Completion of IDP with Mentor, Directorate approvals	December
<input type="checkbox"/> Systematic Review Training (Optional)	Per HSC Library
<input type="checkbox"/> Clinical Experience in EAC	Ongoing
<input type="checkbox"/> Assignment of Clinical Mentor	October
<input type="checkbox"/> Completion of Practicum Project	Ongoing
Required Courses and Events <ul style="list-style-type: none"> <input type="checkbox"/> IDP Review with Directorate (Plus Mentor) <input type="checkbox"/> Graduate Coursework <input type="checkbox"/> Graduate Seminars <input type="checkbox"/> Monthly MD-PhD Dinners <input type="checkbox"/> Planning Fall Retreat <input type="checkbox"/> Responsible Conduct of Research <input type="checkbox"/> Rigor and Reproducibility <input type="checkbox"/> Spring Symposium 	Ongoing December (May) Ongoing Ongoing Ongoing September May

2020-21 UF MD-PHD PROGRAM MILESTONES (YEARS 1-8)

GS2 (Year 4)	
Milestone	Deadline
<input type="checkbox"/> Mentored Research Practicum, Presentations, Publications as First Author	Ongoing
<input type="checkbox"/> Learn, Discover, Lead Professional Skills Seminar Series	Monthly
<input type="checkbox"/> Clinical Experience at EAC/Clinical Leadership Project	Ongoing
<input type="checkbox"/> Analyze and Write-up Practicum Project	September
<input type="checkbox"/> Interaction with Clinical Mentor	Monthly, July
<input type="checkbox"/> Intro to Statistical Data Analysis	Monthly
<input type="checkbox"/> Organization of Spring Symposium	June
<input type="checkbox"/> Grant writing course (GMS 5805)	June
<input type="checkbox"/> Prepare F30 Application, Mock Study Section, Submit	NIH Submission Date Aug 15
Required Courses and Events <ul style="list-style-type: none"> <input type="checkbox"/> IDP Review with Directorate (Plan Mentor) <input type="checkbox"/> Graduate Coursework <input type="checkbox"/> Graduate Seminars <input type="checkbox"/> Monthly MD-PhD Dinners <input type="checkbox"/> Fall Retreat <input type="checkbox"/> Spring Symposium 	December (May) Ongoing Ongoing Ongoing October May

GS3 (Year 5)	
Milestone	Deadline
<input type="checkbox"/> Mentored Research, with publication as first author, presentations	Ongoing
<input type="checkbox"/> Learn, Discover, Lead Professional Skills	Monthly
<input type="checkbox"/> Clinical Experience at EAC	Ongoing
<input type="checkbox"/> Interaction with Clinical Mentor	Monthly
<input type="checkbox"/> Revise and Resubmit F30	NIH Due Dates
Required Courses and Events <ul style="list-style-type: none"> <input type="checkbox"/> IDP Review with Directorate (plus Mentor) <input type="checkbox"/> Graduate Seminars <input type="checkbox"/> Monthly MD-PhD Dinners <input type="checkbox"/> Fall Retreat <input type="checkbox"/> Spring Symposium 	December (May) Ongoing Ongoing October May

2020-21 UF MD-PHD PROGRAM MILESTONES (YEARS 1-8)

GS4 (Year 6) or GS5 if Needed	
Milestone	Deadline
<input type="checkbox"/> Mentored Research Presentations, Publications	Ongoing
<input type="checkbox"/> Completion, Presentation, and Defense of Dissertation	June
<input type="checkbox"/> Clinical Transition Curriculum and Clinical Testing	Ongoing
<input type="checkbox"/> Commencement for PhD Degree Graduates	May
Required Courses and Events <input type="checkbox"/> IDP Review with Directorate <input type="checkbox"/> Graduate Coursework <input type="checkbox"/> Graduate Seminars <input type="checkbox"/> Monthly MD-PhD Dinners <input type="checkbox"/> Fall Retreat <input type="checkbox"/> Spring Symposium	December (May) Ongoing Ongoing Ongoing October May

MS3 (Year 7)	
Milestone	Deadline
<input type="checkbox"/> Clinical Clerkships	Ongoing
<input type="checkbox"/> Presentation and publication of dissertation research as first author	Ongoing
Required Courses and Events <input type="checkbox"/> IDP Review with Directorate <input type="checkbox"/> Monthly MD-PhD Dinners <input type="checkbox"/> Fall Retreat <input type="checkbox"/> Spring Symposium	December (May) Ongoing October May

MS4 (Year 8)	
Milestone	Deadline
<input type="checkbox"/> Clinical Clerkships and Electives	Ongoing
<input type="checkbox"/> Open months for publication from dissertation	Ongoing
<input type="checkbox"/> USMLE Step 2 CS and CK	July
<input type="checkbox"/> Application for Post Graduate Training	Ongoing

2020-21 UF MD-PHD PROGRAM MILESTONES (YEARS 1-8)

<input type="checkbox"/> Meeting with Transitions <input type="checkbox"/> Write personal statement <input type="checkbox"/> Collect letters of reference <input type="checkbox"/> Submit residency applications <input type="checkbox"/> Residency interviews <input type="checkbox"/> Match Day	August August December December October-February March
<input type="checkbox"/> Commencement	May
Required Courses and Events <input type="checkbox"/> IDP Review with Directorate (Dec) <input type="checkbox"/> Monthly MD-PhD Dinners <input type="checkbox"/> Fall Retreat	December (May) Ongoing October