



2023-2024 MMSc RESEARCH GUIDEBOOK

INTRODUCTION TO HSDM RESEARCH

The Office of Research supports a vibrant research program at HSDM. This includes support for basic science laboratories, clinical researchers, faculty, Advanced Graduated Education (AGE) students, DMD students, and postdoctoral fellows. The Office oversees all research-related training activities, courses and student research requirements, the DMSc in Oral Biology Program, the DMD-PhD program, the DMD-DMSc program, and the Office of Research Seminar Series. The Office of Research provides guidance and will support students as they fulfill their research requirements. Please do not hesitate to reach out to any member of the office.

HSDM OFFICE OF RESEARCH



Yingzi Yang, PhD

Associate Dean for Research
Yingzi_Yang@hsdm.harvard.edu
617.432.8304 / REB 512A



Jim McBride

Director of Core Laboratories
Jim_McBride@hsdm.harvard.edu
617.432.5615 / REB 408A



Francesca Gori, PhD

Director for Student Research
Francesca_Gori@hsdm.harvard.edu
617.432.1949 / REB 307



Ellana Haakenstad, MPH

Research Program Administrator
Ellana_Haakenstad@hsdm.harvard.edu
617.432.5157 / REB 404



Christine Riedy, PhD MPH

Director for Oral Health Workforce
Innovation and Population Health
Christine_Riedy@hsdm.harvard.edu
617.432.5251 / REB 206



Zachary Tuomey

Research Program Coordinator
Zachary_Tuomey@hsdm.harvard.edu
617.432.5743 / REB 512



Mallory Hackett

Administrative Coordinator
Mallory_Hackett@hsdm.harvard.edu
617.432.5743 / REB 512

Contents

RESEARCH REQUIREMENT GRID 3

FUNDAMENTALS OF RESEARCH COURSE 4

AGE RESEARCH SEMINAR SERIES COURSE 4

THESIS PROCESS..... 5

IDENTIFY A RESEARCH MENTOR & DESIGN PROJECT- FACULTY POSTER DAY 5

OBTAIN IRB/IACUC APPROVAL 5

THESIS ADVISORY COMMITTEE..... 5

THESIS PROPOSAL APPROVAL MEETING..... 6

WRITE THESIS 7

THESIS DEFENSE 8

HSDM STUDENT RESEARCH DAY..... 8

ADDITIONAL RESEARCH INFORMATION & RESOURCES..... 9

RESEARCH REQUIREMENT GRID

COMPONENTS TO BE COMPLETED BY THE END OF YEAR 3

- Coursework
- Oral Qualifying Exam
- Identify a Research Mentor/Design Project
- Select Thesis Advisory Committee
- Conduct Research
- Three Thesis Advisory meetings (Spring Y1, Fall Y2, Fall Y3)
- Submit Thesis Proposal
- Write Thesis
- Select a Thesis Defense Committee (with assistance from the Office of Research)
- Attend Faculty Poster Day (Y1)
- Attend Office of Research Seminar Series
- Attend Student Research Day (all years)
- Present at Student Research Day (Y3)
- Defend Thesis
- Submit Thesis Electronically

YEAR 1	YEAR 2	YEAR 3
Attend Faculty Poster Day September 6th, 2023 6:00-8:00pm		
Pass Fundamentals of Research Fall	Meeting #2 with Thesis Advisory Committee Fall	Meeting #3 Thesis Advisory Committee Fall
Select Thesis Advisory Committee and Submit for Approval Spring	Conduct Research Fall/Spring	Conduct Research Fall/Spring
Meet with Thesis Advisory Committee (meeting #1) * Spring	Conduct Research Fall/Spring	Finalize Thesis Spring
Submit Thesis Proposal for Approval May 31 deadline	Conduct Research Fall/Spring	Thesis Defense** April 15 deadline
Attend AGE Seminar Series Spring	Attend AGE Seminar Series Spring	AGE Seminar Series Present Spring
Attend Student Research Day Spring	Attend Student Research Day Spring	Present at Student Research Day*** April 15 deadline

*research mentor must approve the proposal and attend all meetings of Thesis Advisory Committee

** research mentor must approve the thesis and attend the Thesis Defense

*** research mentor must approve the poster

Yellow Highlight = Academic sanctions applied for failure to meet deadline

FUNDAMENTALS OF RESEARCH COURSE

The Fundamentals of Research course will expose students to the basic and clinical research that is being conducted at HSDM. It will also provide students with the necessary tools for developing a testable scientific hypothesis, the design and critique of a scientific experiment, as well as how to structure and write a scientific paper. The course will also teach students proper oral scientific presentation and communication. Students will be required to complete writing and group assignments, lesson quizzes, and prepare a presentation. **Attendance of all course lectures is mandatory.** Course Instructor: Dr. Christine Riedy. Zach Tuomey is the administrative contact.

Course lectures will cover the following content:

1. Philosophy of Science
2. Ethics – scientific conduct of research, reliable presentation of results, human and animal
3. studies – IACUC/IRB
4. Literature search tools and EndNote overview
5. Methods- Laboratory research methods
6. Methods- Clinical trials; Epidemiologic and health services study designs
7. Faculty Panel – Basic Science
8. Faculty Panel – Clinical Science
9. Epidemiologic and Health Services Science
10. Principles of Scientific Writing and Data Visualization; Writing an Abstract, Results, and Discussion
11. Hypothesis Development
12. Articles critique discussion
13. Final presentations

AGE RESEARCH SEMINAR SERIES COURSE

The AGE Research Seminar Series' Course is held in the spring semester each year. Graduating MMSc students must present their research to their colleagues and faculty. **Attendance is mandatory for all AGE students regardless if you are presenting or not.** Students who are presenting must submit their abstract a week in advance and will prepare a 20 - minute presentation. Course Instructors: Dr. Jennifer Gibbs and Dr. Lorenzo Tavelli. Zach Tuomey is the administrative contact.

Students will be evaluated on:

- Abstract quality and formatting
- Overview of the project
- Specific aims and hypothesis
- Research design and methods
- Results, discussion, and conclusions
- Responses to comments and questions
- Quality of the presentation
- Attendance at the Office of Research Seminar Series (see below)

HSDM OFFICE OF RESEARCH SEMINAR SERIES

Students enrolled in any MMSc program are strongly encouraged to attend the Research Seminar sessions. These are monthly talks by invited faculty who are experts in their field of research (titles to be announced closer to the date). The Seminar Series will be held at HSDM on one Wednesday per month from 12pm to 1pm in the REB Auditorium.

THESIS PROCESS

The thesis process starts in **Year 1** of the MMSc program. Students and their mentors will be asked to complete a yearly survey reporting the progress of their thesis. The process includes the following steps:

- Select Mentor/Lab
- Conduct Research
- Select Thesis Advisory Committee
- Meetings with Thesis Advisory Committee
- Thesis submission
- Thesis Defense

IDENTIFY A RESEARCH MENTOR & DESIGN PROJECT- FACULTY POSTER DAY

The importance of mentor and project selection should not be overlooked - they are crucial to the quality of your experience and the successful completion of your requirements. Thus, students should expect to devote a considerable amount of time to this step, critically assessing the research environment offered by the mentor. It is essential that the specific aims of the project be clearly delineated and feasible within the available timeframe. Students' Research Mentor will guide students in all aspects of development of the thesis topic - as well as with the preparation and presentation for thesis advisory committee meetings, a prerequisite to completing your thesis work. Attending the Faculty Poster Day on year 1 represent a great opportunity to learn about available projects and to meet mentors.

The most comprehensive database for Faculty mentors is on the Harvard Catalyst website:

<http://connects.catalyst.harvard.edu/Profiles/SearchProfiles.aspx>. Please contact the Office of Research and/or Dr. Gori (francesca_gori@hsdm.harvard.edu) for assistance identifying a mentor.

OBTAIN IRB/IACUC APPROVAL

HSDM students are subject to the same policies, guidelines and regulations as the Faculty of Medicine. It is therefore necessary for student research projects to be reviewed by the Office of Research Subject Protection. The Committee on Human Studies has an Internal Review Board and reviews all human subject-related research projects. The Standing Committee on Animals has an Institutional Animal Care and Use Committee and reviews all animal subject-related research projects. It is important to note, it is HSDM's policy that students should not submit their own application, but instead, work with their Research Mentor under their application. Information on HMS/HSDM IRB and IACUC training, requirements, and approvals, and all relevant documents, can be found on the website of the HMS Office for Research Subject Protection, <http://www.hms.harvard.edu/orsp/index.html>. Students are required to obtain all appropriate HMS/HSDM institutional and site approvals (domestic or international) before commencing research activities. If you have a question about whether your research needs an IRB review, contact them. They can be reached at orsp@hms.harvard.edu.

THESIS ADVISORY COMMITTEE

The Thesis Advisory Committee advises and counsels students on their projects. The Thesis Advisory Committee is comprised of two full-time faculty members. Part-time faculty or outside experts may serve on the committee based upon the nature of the project and the faculty's area of expertise. Students may select one non-HSDM member appointed in a preclinical science department of the Faculty of Medicine, the Faculty of Public Health, or the Massachusetts Institute of Technology (if the research is related to biomaterials or bioengineering). All members of the committee should be well acquainted with the student's area of research, need to commit to attend all meetings (one meeting/year) and need to sign

the Thesis Advisory Committee Member Responsibility Form, which can be found in the Research Guidebook, prior to the first meeting. The research mentors must attend all meetings and although they are non-voting members of the Committee and do not serve as official reader, should participate in the discussion. The membership of the Thesis Advisory Committee must be approved by the Program Director, the Director for Student Research (Dr. Gori) and the Associate Dean for Research (Dr. Yang) before a meeting is convened. Students must submit the signed Thesis Advisory Committee Member Responsibility Form and Thesis Advisory Committee Approval Form before the first meeting is scheduled. Both forms may be found in the Research Guidebook. Please see the Research Program Coordinator with questions and to obtain the required signatures.

THESIS PROPOSAL APPROVAL MEETING

Meeting#1: YEAR 1, May 31 deadline

At this meeting, students must present their proposal describing the research topic and experimental plan, for evaluation and approval by the committee. Students must submit a written proposal to all members of the committee 7-10 days in advance of their scheduled meeting. This proposal should include: **Abstract, Background, Specific Aims, and Methods.** Preliminary results can also be included if available but are not required for the first meeting. The research plan must contain sufficient detail to permit the advisory committee to provide detailed guidance in shaping the conceptualization and methodology of the plan. Students must present their research plan during the meeting. The meeting should be scheduled for 2 hours. The committee must unanimously approve the dissertation topic and research plan before students move forward with the research. Comments and changes suggested by the committee need to be addressed and presented in the following meetings. Students must have their committee complete the Thesis Proposal Approval Form, including a summary of suggested changes, and submit to the Office of Research. The research mentor will be non-voting member of the Committee and will not serve as official readers, but can and should participate in the discussion and, if needed, offer clarification and suggestions to the advisory committee members.

Meeting#2: YEAR 2 Fall semester deadline

At this meeting, students must present their proposal describing the research topic, experimental plan, and preliminary results for evaluation and approval by the committee. Students must submit a written proposal to all members of the committee 7-10 days in advance of their scheduled meeting. This proposal should include: **Summary** (1 page describing the comments and changes suggested by the committee at the previous meeting and how these were addressed), **Abstract, Background, Specific Aims, Methods, and Preliminary or Final Results.** Students must present their research plan during the meeting. The meeting should be scheduled for 2 hours. The committee must unanimously approve the dissertation topic and research plan before students move forward with the research. Comments and changes suggested by the committee need to be addressed and presented in the following meetings. Students must have their committee complete the Thesis Proposal Approval Form, including a summary of suggested changes, and submit to the Office of Research. The research mentor will be non-voting member of the Committee and will not serve as official readers, but can and should participate in the discussion and, if needed, offer clarification and suggestions to the advisory committee members.

Meeting#3: YEAR 3 Fall semester deadline

At this meeting, students must present their thesis proposal describing the research topic, experimental plan and preliminary results for evaluation and approval by the committee. Students must submit 7-10 days in advance to their scheduled meeting a written proposal to all members of the committee. This proposal should include: **Summary** (1 page describing the comments and changes suggested by the committee at the previous meeting and how these were addressed), **Abstract, Background, Specific aims, Methods, Results and Discussion.** Students must present their research plan during the meeting.

The meeting should be scheduled for 2 hours. The committee must unanimously approve the dissertation topic and research plan before students move forward with their thesis defense. Students must have their committee complete the Thesis Proposal Approval Form, including a summary of suggested changes, and submit to the Office of Research. The research mentor will be non-voting members of the Committee and do not serve as official readers, but can and should participate in the discussion and, if needed, offer clarification and suggestions to the advisory committee members.

WRITE THESIS

The student should work closely with the mentor during the writing phases of the project. In either case, there are no page requirements or limitations. The thesis should follow the formal thesis format with the following guidelines:

TITLE PAGE:

A Thesis Presented by
[Full Name, including Middle Name of Author with no Abbreviations] to
The Faculty of Medicine
In partial fulfillment of the requirements for the degree of
Master of Dental Medicine
Research Mentor: [Name], [Title], [Institutional affiliation]

Harvard School of Dental Medicine Boston, Massachusetts
[Month and Year of Submission]

ABSTRACT: 500 words or less, summarize your project.

INTRODUCTION: Significance, Background, and Hypothesis. This section should review the pertinent literature, (including preliminary data if possible), and outline the major purpose of the research. Reference should be made to previous relevant studies in order to explain what has been done as well as to explain the purpose of this research. This section should include a succinct articulation of the hypothesis tested.

APPROACH: Explain your Experimental Design and Statistical Analyses. Describe clearly and carefully the procedures and materials used; a reader should be able to repeat your exact methodology. This section should also include the overall research design and statistical methods.

RESULTS: Report the results in a well-organized fashion with minimal subjective comment or reference to the literature. This section serves mainly to introduce tables and figures and to call attention to their significant parts.

DISCUSSION AND FUTURE DIRECTION: The data should be explained and interpreted with reference to the previous literature. The significance of the results may also be included. This is the section in which to emphasize subjective comment. In a thesis, the scope of the discussion extends beyond that of a journal article. For example, you may discuss why your first experiments failed, or how you arrived at the design for a particular protocol, or what you would do next if you were continuing the study.

REFERENCES: References must be double-spaced and numbered consecutively as they are cited. References first cited in a table or figure legend should be numbered so that they will be in sequence with references cited in the text at the point where the table or figure is first mentioned.

THESIS DEFENSE

THESIS DEFENSE COMMITTEE

When students have completed their research, the Thesis Defense Committee will be formed. The Defense Committee should be similar in composition to the Thesis Advisory Committee; however, the membership of the Defense Committee must be different from that of the Advisory Committee. There may be carry over from the Thesis Advisory Committee to the Thesis Defense Committee however there must be two new readers. In addition, the student's program director and research mentor cannot serve as official members of the Defense Committee. The membership of the Thesis Defense Committee must be approved by the Program Director, the Director for Student Research (Dr. Gori) and the Associate Dean for Research (Dr. Yang) before a meeting is convened. Students may be asked to obtain CV's for individuals who are not affiliated with Harvard University or are new to the AGE Research process. Students must obtain approval before any meeting is scheduled. The form for Thesis Defense Committee approval may be found in the Research Guidebook. Please see the Program Coordinator with questions.

THESIS DEFENSE

The student should schedule a meeting with the Thesis Defense Committee, as the thesis nears completion. At least 2 weeks prior to the meeting, the thesis must be distributed to members of the Committee. In addition, the Office of Research must be notified, in writing, as to the date, time, and location of the Thesis Defense as well as the membership of the Thesis Defense Committee. **Notify the Office of Research by February 15, in writing, of the thesis title and membership of the Thesis Defense Committee.** Thesis guidelines are in the MMSc Research Guidebook and samples of theses may be obtained from the Office of Research. At the conclusion of the defense, the candidate is excused from the room while the Committee votes on the acceptability of the thesis. If the Thesis Defense Committee recommends specific changes in the written document, these changes must be incorporated into a revised version of the thesis, which is then circulated among Committee members for final approval.

THESIS SUBMISSION

Once students have successfully defended their thesis, they need to provide the Office of Research with a copy of the signature sheet. Students will then submit their thesis online at <https://countway.harvard.edu/etds> prior to graduation. Print copies can be ordered using this service.

HSDM STUDENT RESEARCH DAY

Student Research Day will be held on April 9, 2024. The primary focus of this all-day event is for graduating DMD, MMSc, DMSc to showcase their research to faculty and fellow students. All graduating DMSc students are required to present a poster and must submit an abstract (500 words maximum) of their research to the Office of Research for inclusion in an abstract book. A sample may be found at the end of this Guidebook. The submission of the poster must be approved by the Research Mentor and the Program Director.

The Office of Research awards "best poster" certificates for each student group. Further poster guidelines and a template will be circulated in February 2024. Faculty and Postdoctoral Fellow reviewers look at six criteria when evaluating posters:

- Student's ability to describe the work and its significance;
- Organization and clarity of the poster presentation;
- Introduction and formulation of hypothesis and scientific method;
- Quality and extent of work done by the student;
- Student's overall understanding of the project; and
- Overall evaluation of the poster and presentation.

ADDITIONAL RESEARCH INFORMATION & RESOURCES

ACADEMIC, PROFESSIONAL, AND SCIENTIFIC CONDUCT:

PREPARATION OF PAPERS AND OTHER WORK

All homework assignments, projects, lab reports, papers and examinations submitted for a course are expected to be the student's own work. Students should always take great care to distinguish their own ideas and knowledge from information derived from other sources. The term "sources" includes not only published or electronic primary and secondary material, but also information and opinions gained directly from other people. It is each student's responsibility to understand the expectations of academic integrity, proper forms of citation, and submission of one's own work. In addition, collaboration in the completion of assignments is prohibited unless explicitly permitted by the instructor, in which case it must be acknowledged.

AUTHORSHIP GUIDELINES

Authorship is an explicit way of assigning responsibility and giving credit for intellectual work. Below are the authorship guidelines

- Everyone who is listed as an author should have made a substantial, direct, intellectual contribution to the work. For example (in the case of a research report) they should have contributed to the conception, design, analysis and/or interpretation of data. Honorary or guest authorship is not acceptable. Acquisition of funding and provision of technical services, patients, or materials, while they may be essential to the work, are not in themselves sufficient contributions to justify authorship.
- Everyone who has made substantial intellectual contributions to the work should be an author. Everyone who has made other substantial contributions should be acknowledged.
- When research is done by teams whose members are highly specialized, individual's contributions and responsibility may be limited to specific aspects of the work.
- All authors should participate in writing the manuscript by reviewing drafts and approving the final version.
- One author should take primary responsibility for the work as a whole even if he or she does not have an in-depth understanding of every part of the work.

RESEARCH RESOURCES:

CORE RESEARCH FACILITIES

The Harvard Catalyst core facilities database is powered by the eagle-i network and is searchable by category, institution, or keyword <https://cores.catalyst.harvard.edu>. Please contact Jim McBride, Director of Core Labs at HSDM, if you are interested in learning more about our facilities or have questions regarding facilities, equipment, or training. It is important to note that you must be trained to use equipment and access laboratories at HSDM.

SUBMITTING A GRANT APPLICATION

If you do plan on submitting a grant application, please work with the Office of Administration and Finance. They must be notified prior to the submission deadline. All grant applications must be approved through the Office of Administration and Finance as well as your Research Mentor prior to submission. This pertains to all funding (including but not limited to government awards, foundation awards, dental society awards) even if they do not require institutional approval. If you have any questions about this policy, please speak with the Associate Director of Grants Administration.

POSTER PRINTING

For poster printing, the HSDM Office of Research will pay for the printing of posters of standard-size on standard industry poster paper. The HSDM Office of Research has an account at www.phdposters.com. From this link, click the orange tab "Start your order now" then under the three orange tabs, you will see

a link "or use a PhD Posters group account," click here and then log in HSDM; password HSDMResearch. You are responsible for picking up your poster on Longwood Avenue. The Office of Research will not pay for special materials, oversized posters, rushed orders, or shipping.

TRAVEL FOR ANNUAL CONFERENCES

Should you travel off-campus for **presenting** any posters at a conference, you may be eligible for up to \$500 in reimbursement per fiscal year (July 1-June 30). This is a reimbursement which will be awarded upon **return** of your attendance of any conference. In order to apply, you must complete the travel reimbursement form included here **prior** to your travel and submit it to the Office of Research for approval. Once approved, submit all receipts/confirmations (electronic or hardcopy is accepted) to the Office of Research Program Coordinator.

The Office of Research only reimburses for transportation (airfare/train/car rental/taxi/ride share service), conference fees, and lodging (hotels/motels/Airbnb). All purchases must be made by you and in your name. If you plan on sharing the cost with another person you must have your own receipt reflecting your half of the payment.