



# 2019-2020 MMSc RESEARCH GUIDEBOOK

## INTRODUCTION TO HSDM RESEARCH

By leveraging its scientific strengths and focusing on the areas of skeletal biology and the pathology of bones, joints, vascular and connective tissues, Harvard School of Dental Medicine (HSDM) has established a strategic direction for its basic science research programs. HSDM's long-term goal is to be at the forefront of research into the cause and cure for diseases of bone and craniofacial soft tissues. Such research enables dental medicine to impact new avenues of research and investigation into major skeletal disorders such as osteoporosis and osteoarthritis, autoimmune diseases, tumor biology, and wound healing, taking dentistry beyond the mechanical techniques, and repositioning the discipline firmly in the realm of biology.

As the only School within Harvard University with its own clinical facility, HSDM continues to differentiate itself through a unique emphasis on clinical, translational, health policy and epidemiological research combined with exemplary patient care and education. HSDM has become a leader in oral health informatics, specifically dental diagnostic terminology in the electronic health record, patient safety, and quality improvement. Clinical research projects at HSDM are focused on dental genetics, regeneration, color science and soft tissue esthetics, early caries detection, fixed prosthodontics, oral implantology, and applied digital dental technologies.

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, especially Dawn DeCosta.

## HSDM OFFICE OF RESEARCH



**Malcolm Whitman PhD**  
Associate Dean for Basic Science  
malcolm\_whitman@hsdm.harvard.edu  
617.432.1320 / REB-505



**Dawn M. DeCosta**  
Director of Research Operations  
dawn\_decosta@hsdm.harvard.edu  
617.432.1121 / REB-404



**Yingzi Yang PhD**  
Associate Dean for Translational Research  
yingzi\_yang@hsdm.harvard.edu  
617.432.8304 / REB-512A



**Leanne Jacobellis**  
Program Coordinator  
leanne\_jacobellis@hsdm.harvard.edu  
617.432.5743 / REB-408



**Shigemi Nagai, DMD, PhD,**  
Director of Clinical Research  
shigemi\_nagai@hsdm.harvard.edu  
617.432.2928 / REB-405



**Jim McBride**  
Director of Core Laboratories  
jim\_mcbride@hsdm.harvard.edu  
617.432.5613 / REB-408A

# GUIDEBOOK OUTLINE

|   |            |
|---|------------|
| Introduction, Office of Research, ..... | page 1     |
| Guidebook Outline .....                 | page 2     |
| Research Requirement Grids .....        | page 2     |
| Fundamentals of Research .....          | page 3     |
| AGE Research Seminar Series.....        | page 4     |
| Mentor, Project, IRB Approval .....     | page 4     |
| Thesis Process .....                    | pages 5-6  |
| HSDM Student Research Day .....         | page 7     |
| Additional Research Information .....   | pages 7-8  |
| Forms .....                             | pages 9-12 |

## RESEARCH REQUIREMENT GRID

### FOR STUDENTS WHO MATRICULATED IN 2019

#### COMPONENTS TO BE COMPLETED BY THE END OF YEAR 3:

- Coursework
- Select a Research Mentor/Design Project
- Select a Thesis Advisory Committee (with Research Office)
- Write Thesis
- Select a Thesis Defense Committee (with Research Office)
- Defend Thesis
- Submit Thesis Electronically
- Present at AGE Seminar Series
- Present at Student Research Day

| YEAR 1   | YEAR 2                                   | YEAR 3                                   |
|--|--|--|
| Fundamentals of Research (Fall)                    | Convene Thesis Advisory Committee (Fall) | Conduct Research (Fall/Spring)           |
| Select Research Mentor/Design Project (Fall)       | Conduct Research (Fall/Spring)           | Convene Thesis Advisory Committee (Fall) |
| Thesis Advisory Committee Approval (Spring/Summer) | Conduct Research (Fall/Spring)           | Finalize Thesis (Spring)                 |
| Thesis Proposal Approval (Spring)                  | Conduct Research (Fall/Spring)           | Thesis Defense (Spring)                  |
| Attend AGE Seminar Series (Spring)                 | Attend AGE Seminar Series (Spring)       | Present at AGE Seminar Series (Spring)   |
| Attend Student Research Day (Spring)               | Attend Student Research Day (Spring)     | Present at Student Research Day (Spring) |

### FOR STUDENTS WHO MATRICULATED IN 2017 AND 2018

#### COMPONENTS TO BE COMPLETED BY THE END OF YEAR 3:

- Coursework
- Complete Program-Specific Research Requirements
- Present at AGE Seminar Series
- Present at Student Research Day

| YEAR 2                               | YEAR 3                                      |
|--------------------------------------|---|
| Conduct Research (Fall/Spring)       | Complete Program Requirements (Fall/Spring) |
| Attend AGE Seminar Series (Spring)   | Present at AGE Seminar Series (Spring)      |
| Attend Student Research Day (Spring) | Present at Student Research Day (Spring)    |

# FUNDAMENTALS OF RESEARCH

The fundamentals of research course will expose students to the basic and clinical research that is being conducted at HSDM. It will also provide the students the necessary tools for developing a testable scientific hypothesis, design and critique a scientific experiment as well as organize and write a scientific paper. The course will also teach the students proper oral scientific presentation and communication. Students will be required to complete writing and group assignments, lesson quizzes and prepare a presentation. There are 14 mandatory sessions from 3:00 to 5:00 pm in REB Classroom 106. Course Instructors include: Drs. Gili Naveh, Hawazin Elani and Corneliu Sima. Dawn DeCosta is the administrative contact.

## SEPTEMBER 9, 2019

- Course introduction, objectives
- Philosophy of Science

## SEPTEMBER 16, 2019

- Scientific translation- from the lab to the bed side/chair side

## SEPTEMBER 23, 2019

- Ethics – scientific conduct of research, reliable presentation of results, human and animal studies – IACUC/IRB

## OCTOBER 7, 2019

- Literature search tools and endnote overview
- Overview of current laboratory research methods

## OCTOBER 21, 2019

- Panel – Basic Science PI's

## OCTOBER 28, 2019

- Panel – Clinical Research PI's

## NOVEMBER 4, 2019

- Hypothesis development – small groups session

## NOVEMBER 18, 2019

- Present and discuss the developed hypothesis in small groups

## NOVEMBER 25, 2019

- Experimental design and methods, scientific based dentistry with program directors

## DECEMBER 2, 2019

- Abstract writing
- Scientific communication, how to format a scientific presentation, how to give scientific feedback

## DECEMBER 9, 2019

- Student presentations (5-6 students)

## DECEMBER 16, 2019

- Student presentations (5-6 students)

## JANUARY 6, 2020

- Student presentations (5-6 students)

## JANUARY 13, 2020

- Student presentations (5-6 students)

## AGE RESEARCH SEMINAR SERIES

The AGE Research Seminar Series are 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 15-minute presentation. Course Instructors include: Drs. Jennifer Gibbs and Corneliu Sima. Dawn DeCosta 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

## IDENTIFY A RESEARCH MENTOR & PROJECT

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, you should expect to devote a considerable amount of time to this step, critically assessing the research environment offered by the mentor. Clearly, you should find the proposed project interesting and important. Beyond that, it is essential that the specific aims of the project be clearly delineated and feasible within the available timeframe. The mentor should have the resources to enable you to achieve the specific aims. If your project involves human subjects, you should ask whether the mentor has obtained the necessary IRB approval. If the mentor has not obtained approval, you should plan for additional time so that the mentor can obtain such approval. Ideally, a mentor will have demonstrated productivity by a record of publication and a record of private or public funding in a given area. A mentor does not have to be in the field of dentistry. The most comprehensive database for Faculty mentors is on the Harvard Catalyst website: <http://connects.catalyst.harvard.edu/Profiles/SearchProfiles.aspx>.

## 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 his/her 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 even needs an IRB review, contact them. They can be reached at [orsp@hms.harvard.edu](mailto:orsp@hms.harvard.edu); 617-432-3071. Dr. Shigemi Nagai, Director of Clinical Research is an excellent resource for IRB questions and troubleshooting.

# THESIS PROCESS

- Select Thesis Advisory Committee
- Conduct Research
- Check-In Meetings with Thesis Advisory Committee
- Write Thesis
- Thesis Defense
- Thesis Submission

# THESIS ADVISORY COMMITTEE

The Thesis Advisory Committee advises and counsels students on their projects. The Thesis Advisory Committee is comprised of two faculty members. One member must be a full-time faculty member of assistant professor rank or higher, and the other may be a part-time faculty member. Members of the committee should be well acquainted with the student's area of research. The research mentor and program director will be non-voting members of the Committee and do not serve as official readers. The membership of the Thesis Advisory Committee must be approved by the Program Director and the Dean for Research before a meeting is convened. Students must obtain approval before any meeting is scheduled. The form for Thesis Advisory Committee may be found in the Research Guidebook. Please see Dawn DeCosta with questions and to obtain the Dean's signature.

# WRITE THESIS

The format to be used for the thesis should be either that of a journal article or that of a formal 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. If you intend to use the journal article format, consult the requirements of the journal to which you intend to submit the manuscript. At your mentor's discretion the format can be either one of the following: (1) A journal article of publishable quality, or (2) A formal thesis with the following thesis 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  
Doctor of Dental Medicine

Research Mentor: Name, Title  
Institutional affiliation if other than HSDM

Harvard School of Dental Medicine  
Boston, Massachusetts

Month and Year of Submission

**ABSTRACT:** In 500 words or less, summarize your project.

**INTRODUCTION:** Significance, Hypothesis, and Background. This section should review the pertinent literature 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.

**INNOVATION AND APPROACH:** Experimental Design, Expected Outcomes, and Interpretation. 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 AND DISCUSSION:** 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.

**CONCLUSION 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

At the point when the student has completed his or her 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 a new reader. 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 and the Dean for Research before a meeting is convened. Students must obtain approval before any meeting is scheduled.

### THESIS DEFENSE

When the Thesis Advisory Committee determines that the student has completed his/her research project, the student must generate a research thesis. Guidelines for the thesis will be provided by the Office for Research. The student should schedule a meeting of 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. Thesis guidelines are in the 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.

### THESIS SUBMISSION

If the thesis is acceptable, specific changes in the written document are often recommended by Committee members. These must be incorporated into a revised version of the thesis, which is then circulated among Committee members for final approval. If the thesis is unacceptable, the student is expected to carry out additional experiments, make recommended changes, submit a revised thesis, and reconvene the Thesis Defense Committee at a later date. Once you have successfully defended your thesis, please provide the Office of Research with a copy of the signature sheet. You will then submit your thesis online at <http://etds.lib.harvard.edu>, it will automatically generate one bound copy for Countway Library's Archive Department. If you would like additional copies (i.e. your program director, yourself, your family, etc.), you must pay for this service and suggest using: <http://thesisondemand.com>.

# HSDM STUDENT RESEARCH DAY

**Student Research Day will be held on April 7, 2020.** The primary focus of this all-day event is for graduating DMD, MMSc, DMSc, and PhD students to showcase their research to faculty as well as fellow students. All graduating DMSc students are required to present an electronic 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 Office of Research awards "best poster" certificates for each student group. E-Poster guidelines and a sample will be circulated in February 2019. 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 & FORMS

### **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. The two are linked. Authorship practices should be judged by how honestly they reflect actual contributions to the final product. Authorship is important to the reputation, academic promotion, and grant support of the individuals involved, as well as to the strength and reputation of their institution. The Faculty Council of Harvard Medical School has endorsed the following statement. Although authorship practices differ from one setting to another, and individual situations often require judgment, variation in practices should be within these basic 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 Andrea Morris ([andrea\\_morris@hsdm.harvard.edu](mailto:andrea_morris@hsdm.harvard.edu)).

### **RESEARCH TRAVEL AWARDS/**

If you present your research at a conference, then you are eligible to receive a \$500 reimbursement towards conference registration fees, airfare, or hotel. We do not reimburse meals or miscellaneous expenses related to your travel. Please note, you may apply for this stipend annually (once per fiscal year); contact Leanne Jacobellis to apply for a travel stipend after completing the form located in this Guidebook.

### **POSTER PRINTING**

For poster printing, the HSDM Office of Research has an account at [www.phdposters.com](http://www.phdposters.com). From this link, click 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 rushed orders or expedited shipping.

### **SCIENCE TALKS AT HSDM**

If your schedule permits, it is highly suggested that you attend the Science Talks at HSDM. These are monthly talks by invited faculty who are experts in their field of research (titles will be announced closer to the date). Science Talks at HSDM are 11am-12pm in the REB Auditorium.

#### **September 12, 2019**

- Dr. Ling Qin, Associate Professor of Orthopaedic Surgery, University of Pennsylvania

#### **October 10, 2019**

- Dr. Benjamin Levi, Assistant Professor in Surgery, University of Michigan

#### **November 14, 2019**

- Dr. Terrence Capellini, Associate Professor of Human Evolutionary Biology, Harvard University

#### **December 12, 2019**

- TBD

#### **January 16, 2020**

- Dr. Eileen Shore, Professor in Fibrodysplasia Ossificans Progressiva, University of Pennsylvania

#### **February 13, 2020**

- TBD

#### **March 12, 2020**

- Dr. Matthew Greenblatt, Assistant Professor of Pathology and Laboratory Medicine, Cornell University

#### **April 16, 2020**

- Dr. Tamara Alliston, Professor of Orthopaedic Surgery, University of California at San Francisco

#### **May 14, 2020**

- TBD



## **MMSc Thesis Advisory Committee Approval**

Complete all fillable fields below:

Name of Student

Project Title

Research Mentor

### PROPOSED THESIS ADVISORY COMMITTEE MEMBERS

The Thesis Advisory Committee is comprised of two faculty members. One member must be a full-time faculty member of assistant professor rank or higher, and the other may be a part-time faculty member. Members of the committee should be well acquainted with the student's area of research. The research mentor and program director will be non-voting members of the Committee and do not serve as official readers. The research mentor and program director will be non-voting members of the Committee and do not serve as official readers. You must plan on meeting and/or checking in with your committee two times a year.

PLEASE PRINT THE NAMES AND TITLES OF THE MEMBERS OF YOUR THESIS ADVISORY COMMITTEE

Please indicate who the chair of the committee is with an asterisk (\*)

Committee Member 1 Name and Academic Title

Committee Member 2 Name and Academic Title

PROGRAM DIRECTOR SIGNATURE

DATE

ASSOCIATE DEAN FOR RESEARCH SIGNATURE

DATE



## MMSc Thesis Proposal Summary Approval

Complete all fillable fields below:

Name of Student

Project Title

Research Mentor

Meeting Date

PLEASE PRINT THE NAMES AND TITLES OF THE MEMBERS OF YOUR THESIS ADVISORY COMMITTEE  
Please indicate who the chair of the committee is with an asterisk (\*)

Committee Member 1 Name and Academic Title

Committee Member 2 Name and Academic Title

APPROVE THESIS PROPOSAL

APPROVE THESIS PROPOSAL WITH THE FOLLOWING RECOMMENDATIONS

---

---

---

DISAPPROVE THESIS PROPOSAL FOR THE FOLLOWING REASONS

---

---

---

---

---



# HARVARD

School of Dental Medicine

## MMSc Thesis Defense Form

We, the undersigned, have read and approved the thesis of **Dr. (insert student's name)** submitted in partial fulfillment of requirements for the degree of a Doctorate of Medical Sciences at Harvard School of Dental Medicine.

**Dr. (insert student's name)**

**(insert thesis title here)**

---

**Dr. (insert Defense Committee member's name)**

---

**Dr. (insert Defense Committee member's name)**

**Insert date**



## Travel Reimbursement Form

The Office of Research considers funding requests from students who are traveling to present their research. Students may receive up to \$500 per fiscal year (July 1-June 30) in research travel funding towards accommodations, transportation and registration fees. Reimbursements are submitted upon return of travel. Receipts or proof of payment is required and must be in your name.

Please return completed application materials to  
Dawn M. DeCosta, Office of Research, REB-404 or email  
[Dawn\\_DeCosta@hsdm.harvard.edu](mailto:Dawn_DeCosta@hsdm.harvard.edu)

---

Complete all fillable fields below:

Name of Student

HUID #

Research Mentor

Dates of Travel

Name of Conference or Meeting

Have you ever received a reimbursement from Harvard? YES (WHAT YEAR?) NO

If you have never received a reimbursement from Harvard, please see Leanne Jacobellis in REB 408 to provide her with your social security number (do not email this information).

Are you a U.S. Citizen? YES NO

For non-US residents, once the above information has been submitted to HCOM by the Office of Research, you will receive an email from [support@online-tax.net](mailto:support@online-tax.net), an online tool to determine U.S. residency status) providing information on how to log into their program. You must complete their online forms and submit the required document to the NRA Tax Group office as indicated in the program. Your acceptance into the HCOM finance system will not complete until this is successfully completed and accepted by Harvard.

Current Mailing Address

Permanent Mailing Address