



2018-2019 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, as well as clinical, health policy, and global health research, HSDM has established a strategic direction for its research programs. As the only School within Harvard University with its own clinical facility, HSDM continues to differentiate itself through a unique emphasis on basic and clinical research combined with exemplary patient care and education. **All MMSc students at HSDM must complete Scholarly Project (students matriculating in 2018), NIH Proposal and Examination (students who matriculated prior to 2018), AGE Research Seminar Series, and present their research at HSDM Student Research Day as part of their graduation requirement. The Office of Research provides guidance and will support students as they fulfill their research requirements.**

HSDM Office of Research

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Research Requirement Grid

MMSc Candidates Matriculating in 2018:

Year 1	Year 2	Year 3
IDP602: Fundamentals of Research		
	IDPXXX: Scholarly Review (Present)	
AGE Research Seminar Series (Attend)	AGE Research Seminar Series (Attend)	AGE Research Seminar Series (Present)
Student Research Day (Attend)	Student Research Day (Attend)	Student Research Day (Present)

Research Requirement Grid

MMSc candidates who matriculated in 2017, 2016:

Year 1	Year 2	Year 3
IDP602: Introduction to Research		
IDP701: NIH-Proposal Examination		
AGE Research Seminar Series (Attend)	AGE Research Seminar Series (Attend)	AGE Research Seminar Series (Present)
Student Research Day (Attend)	Student Research Day (Attend)	Student Research Day (Present)

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 11 mandatory sessions from 3:00 to 5:00 pm in REB Classroom 106. A drop box has been set up and all assignments will be posted to that. Course Directors are Dr. Gili Naveh and Dr. Hawazin Elani.

MONDAY, SEPTEMBER 10, 2018

- Course introduction, objectives
- Philosophy of Science

MONDAY, SEPTEMBER 17, 2018

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

MONDAY, SEPTEMBER 24, 2018

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

MONDAY, OCTOBER 1, 2018

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

MONDAY, OCTOBER 15, 2018

- Panel – Basic Science PI's

MONDAY, OCTOBER 22, 2018

- Panel – Clinical Research PI's

MONDAY, OCTOBER 29, 2018

- Hypothesis development – small groups session

MONDAY, NOVEMBER 5, 2018

- Present and discuss the developed hypothesis in small groups

MONDAY, NOVEMBER 19, 2018

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

MONDAY, DECEMBER 3, 2018

- Introduction writing
- Results and conclusions

MONDAY, DECEMBER 10, 2018

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

MONDAY, JANUARY 28, 2019

- Student presentations (5-6 students)

MONDAY, FEBRUARY 4, 2019

- Student presentations (5-6 students)

MONDAY, FEBRUARY 11, 2019

- Student presentations (5-6 students)

MONDAY, FEBRUARY 25, 2019

- Student presentations (5-6 students)

Scholarly Review

BACKGROUND

The Scholarly Review is a new requirement for MMSc students matriculating in 2018 and later. The Scholarly Review is a critical evaluation of a particular problem or research question. The type of review (systematic review, literature review, case-control studies, etc.) is up to you, but the Scholarly Review must transform a research idea or clinical problem into an answerable research question. The Office of Research will approval topics and students must complete a 10-page review and present it to 2 faculty members

ORGANIZATION

- Refine a research idea or clinical problem into an answerable research question.
- Research the importance of the idea (clear, scientific explanation of why the problem is critical). Keep the review focused.
- Search the literature for relevant evidence and critically review the literature.
- Evaluate the approach, results and practical implications.
- Make use of feedback from your colleagues, program director and/or office of research.

WRITING A SCHOLARLY REVIEW

- Title
- Abstract
- Introduction/Overview
- Background/Literature Review
- Materials/Methods
- Discussion/Conclusion

PRESENTING A SCHOLARLY REVIEW

The Office of Research will assign two examiners and schedule this for you. Please be prepared to give a 10-minute overview of your project (you may use a PowerPoint presentation if you like). Please do not use more than 5 slides for your presentation. Be prepared to discuss why you chose this project/topic and the significance of your research question.

AGE Research Seminar Series

The AGE Research Seminar Series are held in the spring semester each year. Graduating DMSc 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. 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; 617-432-3071. Dr. Shigemi Nagai is also an excellent resource for IRB questions and troubleshooting.

HSDM Student Research Day

Student Research Day is an annual event held each April. 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

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).

RESEARCH TRAVEL AWARDS/POSTER PRINTING

If you present a research poster at a national or international conference, then you are eligible to receive a \$500 travel stipend and poster printing through the Office of Research. Please note, you may apply for this stipend annually (once per fiscal year); contact Dawn DeCosta to apply for a travel stipend after completing the form located in this Guidebook. For poster printing, the HSDM Office of Research has an account at 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**.

A Longitudinal Study of Ovarian Morphology in Healthy Ovulatory Women

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Polycystic ovary syndrome (PCOS) affects 5-7% of reproductive aged women. Though its phenotypic expression is variable, PCOS is also associated with infertility, insulin resistance, obesity, cardiovascular risk factors, and endometrial cancer. PCOS is diagnosed using two of three clinical criteria: menstrual dysfunction, hyperandrogenism, and/or polycystic ovarian morphology on ultrasound. Polycystic ovarian morphology (PCOM) is defined as increased ovarian volume or ≥ 12 follicles/ovary.

PCOM on ultrasound is almost universal in women with PCOS. However, PCOM is also found in 16-25% of apparently normal, regularly cycling women. Normally cycling women with PCOM have been shown to have higher androgen and fasting insulin, and lower SHBG levels than women with normal ovarian morphology. Though these levels were still within normal ranges, they reflect trends toward the hormonal abnormalities seen in PCOS.

Based on these hormonal differences, we hypothesized that women with PCOM have an increased propensity to develop PCOS over time compared to women with normal ovarian morphology. To test these hypotheses, women with regular menstrual cycles and normal or polycystic ovarian morphology on ultrasound were studied (n=38) 1.7-18.3 years after a previous ultrasound (mean \pm SD, 8.61 \pm 5.1 years). Subjects underwent a repeat ovarian ultrasound, interval menstrual history, physical exam, and measurement of gonadotropin, androgen and metabolic hormone levels in the early follicular phase.

At the first visit, twenty-three women (60.5%) had PCOM and fifteen (39.5%) had normal ovarian morphology. Among women who had PCOM at previous visit, twelve maintained PCOM and eleven converted to normal morphology at the second visit. In subjects that converted to normal morphology, there was a greater decrease in testosterone from the first to second visit than in those that maintained PCOM (-25.1 \pm 10.2 vs. 2.3 \pm 4.5 ng/mL; p<0.05). One subject with PCOM developed irregular menses during the interval. Among women with normal ovarian morphology at previous visit, two developed PCOM (13.3%), and thirteen maintained normal ovarian morphology. There was no obvious difference in weight, androgens, or metabolic parameters in the two subjects who developed PCOM.

These data indicate that PCOM in women with regular cycles does not appear to confer increased risk for the development of PCOS. Approximately half of women with PCOM convert to normal ovarian morphology with aging, and this conversion is associated with a greater decrease in testosterone over time. These data also show that in women with regular cycles, it is not common to develop PCOM if the ovaries are normal on first assessment.



HARVARD

School of Dental Medicine

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.

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, 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

Please return completed form to Dawn_DeCosta@hsdm.harvard.edu



HARVARD

School of Dental Medicine

Scholarly Review Topic Approval

Complete all fillable fields below:

Name of Student _____

Project Title _____

Research Mentor _____

- APPROVE SCHOLARLY REVIEW TOPIC
- APPROVE SCHOLARLY REVIEW TOPIC WITH THE FOLLOWING RECOMMENDATIONS

PROGRAM DIRECTOR SIGNATURE _____

DATE

Please return completed form to Dawn_DeCosta@hsdm.harvard.edu



HARVARD School of Dental Medicine

Scholarly Review Evaluation

Complete all fillable fields below:

Name of Student _____

Date _____

Evaluator _____

Evaluator _____

Did the student follow the Scholarly Review written format guidelines (title, abstract, introduction/overview, background/literature review, materials/methods, discussion/conclusion)? YES NO

Does the project address an important problem or a critical barrier to progress in the field? YES NO

Does the student have a good understanding of the relevant literature? YES NO

Does the student understand the experimental design and data interpretation? YES NO

GRADE:

- PASS** (No revisions necessary)
- CONDITIONAL PASS** (See details below)
- FAIL** (See details below)

The evaluators will issue a passing grade if the following recommendations are met:

Student must make the recommended changes to his or her proposal by (DATE to be decided by evaluators):

Revision Approval Method (Please check one):

- Revisions can be sent by student to committee via e-mail for approval.
- Revisions are extensive, and committee must be re-convened.
- Other: _____

FAIL (Proposal must be completely re-done. Exam must be re-taken.)

Comments regarding this decision:

Please return completed form to Dawn_DeCosta@hsgm.harvard.edu