

**University of Pennsylvania School of Dental Medicine**  
**Masters of Science in Oral Biology**

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### **Program Overview**

The Master of Science in Oral Biology (MSOB) degree program is comprised of two tracks designed for outstanding students who are interested in either (1) integrating research or (2) structured evidence-based learning into their post-graduate education. Enrollment in the MSOB program tracks is limited to individuals concurrently registered in one of the post-graduate specialty training programs at the University of Pennsylvania School of Dental Medicine (SDM).

Candidates receive the MSOB degree after completion of both their specialty training and the Master's curriculum, which consists of didactic, seminar and research practicum courses. Depending on the track selected, research activities or a systematic literature review form the core of this program. Students are expected to participate in a clinical or basic science research project of sufficient scope and intensity or a formally structured and critically-evaluated literature review focused on an important oral health-related research or clinical question. A thesis composed of an in-depth review of the relevant literature along with a manuscript reporting the results of the research or a systematic review is required for graduation for the research and evidence-based learning tracks, respectively.

**CERTIFICATES FROM THE CLINICAL SPECIALTY PROGRAMS WILL NOT BE AWARDED TO RESIDENTS ENROLLED IN THE MSOB PROGRAM UNTIL AFTER THEIR THESIS IS DEFENDED AND APPROVED BY THE THESIS COMMITTEE.**

### **MSOB Advisory Panel**

The MSOB Advisory Panel will consist of the Program Director and a representative from each of the participating SDM departments. The Associate Dean for Academic Policies and the Director of Post-Graduate Education will serve as *ex officio* to this group. The MSOB Advisory Panel serves four main purposes:

- To assist students in identifying research mentors who are conducting funded research.

- To verify the quality and appropriateness of the proposed research and evidence-based learning activities.
- To monitor the degree candidate's progress prior to writing a thesis.
- To mediate and settle any disputes that may arise.

There will be two regularly scheduled meetings of the MSOB Advisory Panel per semester. The dates and times of the meetings will be announced at the beginning of September and January for the Fall and Spring semesters, respectively. At least five members (a minimum of 2 basic science and 2 clinical faculty members) will be present at each meeting. Additional meetings will be scheduled as needed. The members of the panel are:

Dr. Eric Stoopler	Oral Medicine
Dr. Bekir Karabucak	Endodontics
Dr. Chun-Hsi Chung	Orthodontics
Dr. Joseph DiRienzo	Microbiology
Dr. Kelly Jordan-Sciutto	Pathology
Dr. Claire Mitchell	Anatomy and Cell Biology
Dr. Kathy Battaglia	Biochemistry
Dr. Markus Blatz	Preventative and Restorative Sciences
Dr. Panagiota Stathopoulou	Periodontics
Dr. Evlambia Harkopakis-Hajishengalis	Pediatric Dentistry

### **Matriculation Process**

Application to the MSOB program is completed as an option concurrent with application to the specific graduate programs. Admission into the MSOB program will be granted by the appropriate Program Director. In order to matriculate residents should complete the MSOB Enrollment Form located under Departmental Information/Graduate Dental Education on Inside PDM. Students should specify the program track. This form is also used for course registration and must be presented to the Office of Graduate Dental Education once courses are selected and approved. Following admission to the program a research mentor and project will be identified. The mentor can be any member of the faculty of the School Dental Medicine. Faculty members of other schools within the University can also serve as research mentors with the approval of the MSOB Advisory Panel.

Residents have the option of working on projects that are part of their mentors ongoing research program or an unfunded study. For the evidence-based learning track residents can select a research or clinical question based on the expertise of their mentor. **All projects or evidence-based learning questions must meet the standards of the MSOB program.** The Advisory Panel's approval is not required for research projects that are part of a funded study. **However, unfunded research projects must be approved by the Advisory Panel.** Individuals who pursue this option will be required to:

1. Provide a letter to the Program Director from the research mentor acknowledging his/her willingness to oversee the proposed research.
2. Provide a concise, written summary of the proposed research project including the background and significance, specific aims and a description of the candidate's role in the study.
3. Give a 15 minute oral presentation to the Advisory Panel describing the proposed research project.

The written document must be submitted electronically to the members of the Advisory Panel. If the Advisory Panel does not approve the petition by a majority vote, it will be returned to the student and advisor with specific comments for improvement. Alternatively, a different mentor and/or project can be chosen.

### **Masters Degree Program Competencies**

By the end of the program, students must demonstrate performance in the following competency statements:

- Demonstrate advanced scientific and/or clinical knowledge in the student's selected area of concentration.
- Demonstrate proficiency in delivering oral presentations and scientific writing.
- Critically analyze current literature and report on the strengths, limitations and recommendations for future research design.
- Demonstrate the ability to use each component of the scientific or systematic review methodology in completing a research or evidence-based learning project.
- Discuss ethics in research.

### **Curriculum and Requirements**

Degree candidates will be required to satisfy the MSOB program competencies through performance in classroom assignments, course examinations, MSOB seminar sessions and at the final defense of their research project.

Upon active enrollment in the MSOB program, the degree candidate and research mentor will develop a plan and time table for the completion of the required courses, research practicum and thesis defense. For the two-year post-graduate residency programs in Orthodontics, Endodontics and Oral Medicine, degree candidates are required to devote a third year to research activities during which four days per week will be spent in the laboratory. This will satisfy the criteria for passing the research practicum courses (Dent 994 through 998). For the three- and four-year Periodontics, Periodontal Prosthetics and combined Orthodontics/Periodontics programs, requirements for the degree can be completed during the residents' specialty training. However, in these situations it is expected that residents will spend a minimum of two days per week for two years working on their research in order to pass the research practicum courses. **If,**

**at any time, the program director of the three-, four- or six-year residencies determines that participation in a MSOB-associated research project is interfering with an individual's clinical progress the resident will be given the option of withdrawing from the MSOB program or taking a leave of absence.**

Grading systems will be at the discretion of the director of each course. Any degree candidate who fails one course graded on a pass/fail basis or who receives a grade less than a "B" in a single course using a letter grade system is subject to dismissal from the program. In such instances, the student will be required to meet with the members of the MSOB Advisory Panel who will determine whether the student will be allowed to remediate/retake the course or be dismissed from the program.

All MSOB candidates are required to complete the DADE core curriculum course no later than the end of the first year of their specialty training in order to provide the basic and clinical science foundation for post-graduate study.

The Masters of Science in Oral Biology research track includes the following courses:

DENT 901: DADE Core Curriculum I	One Credit Unit
DENT 902: DADE Mini-Courses	One Credit Unit
BIOL 446: Statistics for Biologists (Fall Semester)	One Credit Unit
BIOE 580: Research Bioethics (Spring Semester)	One Credit Unit
DENT 990: Oral Biology Seminar I	One Credit Unit
DENT 991: Oral Biology Seminar II	One Credit Unit
DENT 992: MS Research Practicum I	Two Credit Units
DENT 993: MS Research Practicum II	Two Credit Units
DENT 994: MS Research Practicum III	Two Credit Units
DENT 995: MS Research Practicum IV	Two Credit Units

All MSOB candidates are required to take two courses outside of the SDM: Statistics for Biologists (BIOL 446) and Research Bioethics (BIOE 580). If the mentor feels that a resident would benefit from a particular course directly relevant to their research, the candidate can request permission from the MSOB Program Director to substitute that course for BIOE 580. This course must be at the 400 level or higher. Such courses include but are **not limited** to:

BE 460:	Introduction to Biomedical Imaging
BE 537:	Biomedical Imaging Analysis
BE 513:	Cell and Molecular Biology
BIOL 404:	Immunobiology
BIOL 607:	Writing Skills for the Biologist
BSTA 510:	Introduction to Human Anatomy and Physiology

The Masters of Science in Oral Biology evidence-based learning track includes the following **required** courses:

DENT 901:	DADE Core Curriculum I	One Credit Unit
DENT 902:	DADE Mini-Courses	One Credit Unit
BIOL 446:	Statistics for Biologists (Fall Semester)	One Credit Unit
BIOE 580:	Research Bioethics (Spring Semester)	One Credit Unit
BIOL 607:	Writing Skills for Biologists	One Credit Unit
DENT 996:	Introduction to Systematic Reviews	One Credit Unit
DENT 990:	Oral Biology Seminar I	One Credit Unit
DENT 991:	Oral Biology Seminar II	One Credit Unit
DENT 997:	Recitation I - PICO Question (literature review to justify the question)	Two Credit Units
DENT 998:	Recitation II - Meta-Analysis	Two Credit Units
DENT 999:	Recitation III - Writing of the Systematic Review	Two Credit Units

In order to register for any course, residents must present the MSOB Enrollment Form with the appropriate signatures to the Office of Graduate Dental Education. The advanced registration period for courses offered in the Fall term are typically the last week of March and first week of April in the preceding Spring term. For courses offered in the Spring term, the advanced registration period is typically the last week of October and first week of November in the preceding Fall term.

To satisfy the requirement for the two Oral Biology Seminar Courses the degree candidate must attend approximately 75% of the regularly scheduled noon-time lectures that make up the Leon Levy Center for Oral Healthy Research Seminar Series during each of two semesters in which he/she is actively working on their project. The seminars are routinely given at noon on Thursdays in Room 338 of the Levy Building. Grades for these courses will be provided by the research mentor and will be based on: (1) the mentor's assurance that an appropriate number of seminars were attended and (2) the mentor's evaluation of their student's ability to comprehend and critically evaluate the seminars that were attended. Each student is required to maintain a list of the lectures he/she attended during the relevant semesters. The list must be signed by the research mentor and turned in to Ms. Pam Beaty in order for the student to receive credit for the course. The manner in which a mentor evaluates a student's comprehension and critical evaluation of seminars is entirely at his/her discretion.

Throughout the research practicum experience, students should meet with their advisor periodically in order to ensure timely completion of the research activities. After the first three months in the Program the mentor will inform the Advisory Panel in writing as to whether the student is making sufficient progress and applying a sufficient effort to the project. Any mentor who indicates lack of satisfactory progress or effort will meet jointly with the Advisory Panel and student within a month to determine the appropriate course of action. When the degree

candidate and advisor feel that he/she has sufficient data to address the research hypothesis a thesis committee meeting will be scheduled as described above.

### **Thesis Committee**

Thesis committees will consist of the research or evidence-based learning mentor and three appropriate SDM standing or associated faculty members (rank of Assistant Professor or higher) chosen by the candidate and his/her mentor. One individual, other than the mentor, will be designated as the chairperson of the committee. This individual will communicate any decisions made by the committee to the Program Director. Minimally, there should be three committee meetings for each degree candidate. The first must be scheduled within the first 3 months of each student's enrollment in the MSOB program to familiarize the committee members with the project. The second meeting will be scheduled when the student and his/her mentor feel that sufficient progress has been made to warrant the writing and defense of a thesis. If the committee concurs, the student will be given permission to assemble a thesis and schedule a date for the defense. In the event that the committee feels that additional work is needed, their expectations will be clearly explained to the student and his/her mentor. Upon completion of the suggested work, the student will schedule another committee meeting to request permission to write and defend their thesis. The third required meeting will take place at the time of the thesis defense when the committee will determine whether the student should be granted the MSOB degree. The student has the option to schedule additional meetings as needed.

### **Thesis**

The written thesis for the research track will consist of the following:

- Title page including the names of the members of the candidate's thesis committee and lines for their signatures.
- Abstract
- Acknowledgements
- Detailed review of the literature with references.
- Manuscript written in a format suitable for publication that describes the research findings. It is preferred but **not** required that the manuscript be submitted for publication. Nor is it required that the candidate be the first or last author if the manuscript is submitted for publication.

The written thesis for the evidence-based learning track will consist of the following:

- Title page including the names of the members of the candidate's thesis committee and lines for their signatures.
- Abstract
- Acknowledgements
- Detailed PICO question with appropriate analytics and references.

- Review manuscript written in a format suitable for publication that describes and critically analyzes the PICO question. It is required that the manuscript be submitted for publication and the degree candidate should be the first or last author.

Students are expected to also complete an oral defense of their research. The written thesis must be distributed to the members of the thesis committee no less than two weeks prior to the date of the defense. A meeting of the committee to review the thesis will follow the defense. The chairperson will notify the student, the advisor and the MSOB program director as to whether the thesis has been accepted or additional work is required prior to acceptance. Once approved, a hardcopy of the thesis cover page must be signed by all members of the committee. The student will then download a scanned copy of the signed cover page along with the approved thesis onto Scholarly Commons for electronic archiving. Instructions for downloading documents onto Scholarly Commons can be found on the University Library webpage. The hardcopy of the cover page and an electronic version of the thesis must be submitted to the office of Graduate Dental Education. Finally, the MSOB Program Director's signature on the MSOB Sign Out Form is required in order for a degree to be awarded. This form can be found on Inside SDM under Departmental Information/Graduate Dental Education. Bound hardcopy versions of the thesis are no longer required but are available through the PDM Library if desired by the student and/or mentor. In the event that the thesis is not accepted by the committee the student is expected to make the necessary revisions and resubmit the thesis within a within a time frame determined by the committee. The committee will have two weeks to review the revised thesis and grant their approval.

### **Participation in Commencement Exercises and Awarding of Degrees**

The University awards degrees three times every year. To qualify for a May diploma, the thesis must be defended and approved no later than June 30<sup>th</sup>, August 31<sup>st</sup> for an August diploma and December 31<sup>st</sup> for a December diploma. The Office of Student Affairs must be notified of the names of anticipated May graduates by January 31<sup>st</sup>. Therefore, if a resident intends to receive a May diploma he/she must provide the MSOB Program Director with a letter from their mentor acknowledging that sufficient progress has been made towards this goal. Only residents eligible to earn a May diploma will be permitted to participate in the SDM commencement exercises held in May. This requires the MSOB Program Director's signature on the MSOB Graduation Participation Form that can be found under Departmental Information/Graduate Dental Education on Inside PDM.

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## **Tuition and Fees**

Tuition and fees for the MS program vary based on the specific graduate specialty program. Residents in the two-year programs (Endodontics, Orthodontics, Oral Medicine and Pediatric Dentistry) will be required to pay tuition and associated fees at the beginning of the year devoted to the MSOB program. Residents in the three-year Periodontics program, the four-year Periodontal-Prosthesis and combined Orthodontics-Periodontics program, as well as the six-year Oral and Maxillofacial Surgery program, should be able to complete the requirements for the MSOB degree within their residency term. Thus, they will not be required to pay additional tuition or fees. If extra time is required to conclude their research activities, students will be allowed up to 6 months beyond the graduation date of their class on a tuition-free basis. Should more than 6 months be needed the student may be required to pay a prorated tuition fee.