THE OHIO STATE UNIVERSITY

COLLEGE OF DENTISTRY

2018-2019 Master of Science Program Handbook

Updated 6/2018

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1. Purpose of this Handbook

This document describes the specific policies, rules, and procedures that apply to graduate students and faculty in the Master's Program in the College of Dentistry. It is intended to supplement general information provided in the *Graduate School Handbook.* It provides information about the faculty involved in graduate education, the requirements for the Master of Science (MS) degree, and the procedures for accomplishing these requirements. Whenever possible, the student will be reminded about the necessary requirements, but graduate students and their faculty Advisors are responsible for being aware of policies and requirements outlined in this handbook. The most important program deadlines for graduate students are posted on the bulletin board next to the Graduate Studies office on the 4th floor (Room 4133).

2. Objectives of the Program

The objectives of the Master's Program are to:

a) Train graduate students in the theoretical and practical aspects of the scientific method

b) Prepare clinical specialists to critically evaluate the scientific literature throughout their career, so that changes in the rational basis of health care may be incorporated into clinical practice

c) Advance knowledge in the areas of craniofacial biology, biomedical science and clinical therapy

d) Prepare educators to serve as leading members of university faculty and of the general scientific community, capably advancing the understanding of oral and craniofacial disease and deformity.

3. Admission and Registration

The Ohio State University College of Dentistry offers advanced education programs in nine different fields, all located in the nation's most comprehensive health sciences center. Some programs require the student to complete the requirements for the Master of Science degree, while for others a certificate is offered and the master's degree is optional.

A combined specialty/Ph.D. program for applicants oriented toward a career in academic dentistry and research is also available in many of these fields. It is the policy of the College of Dentistry to limit applicants to a single advanced education program per academic year. Applications submitted to more than one program in a given year

will not be accepted and may delay processing of the intended primary program application**.**

The admission criteria outlined in the *Graduate School Handbook* apply to the Master's Program. The program directors and the Graduate Studies Committee (GSC) evaluate the applicant's qualifications and admit students to the program. Applicants are normally expected to have completed a D.D.S. or D.M.D. degree (or equivalent) at an accredited dental school. Admission is a competitive process that entails evaluation of the applicant's undergraduate and dental school transcripts, National Board of Dental Examiners scores, letters of recommendation, statement of intent, and other qualifications. Applicants whose native language is not English must also provide a score from the Test of English as a Foreign Language (TOEFL) or an acceptable equivalent. Applicants to the Orthodontics program must provide Graduate Record Examination (GRE) scores.

In order for an application to be considered official, applicants must submit an on-line application and pay an application fee. The College website (http://dentistry.osu.edu/) is the gateway for applying to the Master of Science Program and the Advanced Education Programs. Postdoctoral Application Support Service (PASS) applications are accepted by many, but not all, of these programs.

The student's program director and Advisor will help organize the student's program and course load. Prior to the beginning of each semester, students will receive information about the courses in which they should enroll. Students are responsible for completing their own enrollment. Details on the mechanics of registration are outlined in the *Graduate School Handbook*.

4. Levels of Oversight for Students in the Program

a. **Graduate School**. All graduate programs at The Ohio State University are sanctioned by the Graduate School and governed by its policies. The Graduate School publishes the *Graduate School Handbook*, which describes the policies, rules and procedures that apply to all graduate students enrolled at the University.

b. **Graduate Studies Committee (GSC).** The GSC oversees and administers the Master's Program in the College of Dentistry and serves as the liaison between the Graduate School and the Program's Graduate Faculty members. The responsibilities of the GSC are described in detail in the *Graduate School Handbook*. They include, but are not limited to:
   - Formulating rules and procedures relevant to the Master's program
   - Publishing the graduate program handbook.
   - Considering courses and curricula proposed for graduate credit
   - Monitoring student progress and academic performance
   - Establishing procedures for assigning and changing Advisors
   - Establishing rules related to thesis and non-thesis master's degree programs

- Considering student petitions that pertain to its rules
- Finalizing admission decisions
- Evaluating faculty credentials for Category M Graduate Faculty appointments
- Establishing rules and procedures for the conduct of the Master's examination
- Reviewing student records to ensure that degree requirements are met
- Approving the members of each student's Master's Examination Committee
- Overseeing appeals and grievance proceedings

The GSC is composed of five regular, elected members of the Graduate Faculty of the College of Dentistry. Regular members of the GSC are elected to 5-year, staggered terms, so that the senior member retires and a new member joins the committee each July 1. No more than two members from any one division are eligible to serve at any one time. The Office of Graduate Studies and the GSC will work with the Graduate Faculty to solicit nominations, accept ballots and call the vote in the election of regular members of the GSC. The candidate who receives the most votes wins. In case of a tie, there will be a run-off election. The Chair of the committee is elected from the regular membership of the GSC each year.

In addition to the regular members, the Associate Dean for Advanced Education and Graduate Studies is a non-voting *ex officio* member of the committee. Since some discussions by the GSC can benefit from input from a graduate student, a non-voting graduate student member will be appointed as needed.

c. **Advanced Education Program Directors.** The program directors are responsible for administering the College of Dentistry's eight clinical specialty programs. They set the standards for the quality of their program and define the performance criteria. They also determine the educational content under graduate program guidelines established by the GSC and Commission on Dental Accreditation.

d. **Faculty Advisor.** The Advisor must be a member of the Graduate Faculty, and is responsible for coordinating the graduate student's coursework and research activities, advising the student on approaches for conducting their research project, promoting effective writing and oral communication, and monitoring the student's progress. The Advisor shares the responsibility for planning the research with the student. In addition, the Advisor chairs all committees set up to plan, review, assess and examine the student's progress through the program. Successful completion of the program is dependent on a close working relationship between the graduate student and the Advisor.

The graduate student-Advisor relationship is established by mutual consent between the student and the selected Graduate Faculty member. The relationship must be formalized by written approval from the GSC. Ideally, the Advisor should be experienced in conducting graduate research, have expertise in the research area, and be able to guide the student to successful completion of the project. Immediately after matriculation, the student's program director will serve as an Advisor to assist the student in selecting courses and in pursuing possible areas of

research interest. However, the student should select a formal Advisor before the end of the second semester in the program. The Advisor must be a member of the program's Graduate Faculty. If there is a subsequent change of Advisor, this must be approved by the GSC and the student's clinical program director. In consultation with the student, the Advisor will select an appropriate group of Graduate Faculty members to serve on their Master's Examination Committee.

e. **Master's Examination Committee.** The Examination Committee must include a minimum of three members, including the Advisor. Ideally, it should include at least one member from the graduate student's academic division and at least one member outside of the division. The composition of every Master's Examination Committee must be approved by the GSC (see Appendix C). The responsibilities of the committee include approval of the research protocol before beginning the research project (see Appendix D), administration of the master's examination, and approval of the complete thesis. For some research projects, committee members may serve in a collaborative role. The expertise and potential contribution of individual members should be considered when assembling a committee. If committee members are taking an active role in the project, the student and Advisor should arrange regular meetings with the thesis committee members for discussion at critical phases in the project.

   Selecting an appropriate committee is an important step in successful completion of the graduate program, and it should be undertaken as soon as possible after selection of the Advisor. Typically this is done as an interactive process between the student, the Advisor, and potential committee members. Committee members must be members of the Graduate Faculty. A faculty member who is not a member of the Graduate Faculty but who provides special expertise relevant to the project may be included as a committee member upon granting of a petition for special appointment. Petition for such membership should be made to the GSC, outlining the special qualifications and expected contributions of the proposed committee member. Approval by the Graduate School is granted upon special petition by the GSC based on these qualifications.

5. Master's Program Options and Requirements

The program for the Master of Science is offered under the auspices of the Graduate School of The Ohio State University and the Dean of the Graduate School. The program may be completed as either Plan A (thesis option) or Plan B (without a thesis). Students may pursue either plan, subject to agreement of the Advisor.

a. **University Requirements.** The Graduate School requires students in both plans to complete a minimum of 30 graduate credit hours to earn a master's degree. Eighty percent of those required credit hours must be completed at The Ohio State University over a period of at least two semesters. Students must be registered for at

least three graduate credit hours during the semester in which graduation is expected, and they must achieve a cumulative point-hour ratio of at least 3.0.

During the first weeks of the semester in which graduation is expected, students must submit an application to graduate to the Graduate School through the gradforms.osu.edu electronic forms system. Students must successfully complete the Master's examination and submit the Master's Examination Report form to the Graduate School by the published deadline for the semester of graduation.

b. **Core Curriculum.** In addition to the Graduate School requirements, the program requires all students to successfully complete two core courses:

-Dent 8003: Statistics and research design I (2.0 credit hr)
-Dent 8004: Statistics and research design II (1.5 credit hr)

Students with exceptional backgrounds or equivalent coursework in these areas may petition the GSC for an exemption from these courses.

c. **Thesis Option (Plan A).** Students in this option are required to complete a research project under Graduate Faculty supervision. An original thesis based on the research project must be written and successfully defended. The Master's examination for students pursuing Plan A must include an oral portion, and need not be confined to the thesis topic. The thesis must be approved by the Advisor and the Master's Examination Committee. Students must submit the Thesis Approval form to the Graduate School and submit the approved thesis to OhioLink by the published deadline for the semester of graduation. If the student or Advisor would like to delay dissemination of the thesis, a form to petition to the Graduate School for a delay is available on the Graduate School website.

Thesis defenses must be scheduled during normal University business hours. The date, time and location of each thesis defense should be transmitted to all faculty and students no later than one week prior to the defense. The thesis defense will begin with an oral presentation of the research project by the graduate student. This presentation is typically 20 to 45 minutes long and will be open to all students and faculty of the College of Dentistry. The presentation will be followed by an open question session. Following its completion, the Master's Examination Committee, chaired by the student's Advisor, will continue the examination in a closed session. The committee will comprehensively evaluate the thesis and the student's understanding of the study and its implications. The closed portion of the exam typically extends for 1 to 2 hours. The graduate student will then be excused and the committee will decide whether the student's performance on the examination was satisfactory and whether the thesis is acceptable. The Advisor will then inform the graduate student of their decision.

To make remote participation easier for faculty serving on the committee, the Graduate School recently changed its policy on the use of videoconferencing in Master's examinations. The current policy is described in detail in Appendix B of the Graduate School Handbook.

Students are strongly encouraged to prepare and submit at least one publication-ready manuscript based on their thesis research. Individual advanced clinical training programs may require their students to prepare one or more publishable manuscripts as a requirement for obtaining the M. S. degree or specialty certificate.

d. **Non-Thesis Option (Plan B).** Students in this option are expected to complete an original research project of scope and standard identical to those carried out under Plan A, but are not required to present their findings in a thesis format. Instead, they must successfully complete a written examination that is administered and graded by the student's Master's Examination Committee. During the terminal year of their program, the student (in consultation with the Advisor and Master's Examination Committee) will develop a list of essential literature pertaining to the student's area of research. A 4-hour comprehensive written examination will test the student's mastery of this body of literature, and need not be confined to the research topic. Individual advanced clinical training programs retain the option to include an oral component in the Master's Examination.

   Students are required to prepare at least one publication-ready manuscript based on their research findings. The Master's Examination Committee acts as a special reading committee for the research component of the program and must approve the resulting manuscript(s).

e. **Suggested Timeline for Completion**. It is important for students to adhere to an appropriate schedule for completion of the research requirement. The following is a proposed timeline for the research activities in a three-year program.

   First Year, Summer and Autumn Semesters: Graduate students should become familiar with the research interests and expertise of the Graduate Faculty and explore opportunities for research in their area of interest. Ideally, an Advisor and research topic should be selected by the end of Autumn Semester.

   First Year, Spring Semester: A Master's Examination Committee should be established as early as possible, and its membership approved by the GSC (see Appendix C). The student should then develop a research protocol (including a comprehensive literature review) to submit for approval by the Master's Examination Committee (see Appendix D). The graduate student must work with their Advisor to accomplish this goal. By the end of the first year, the student should have a completed an approved research protocol. If the research involves human subjects or laboratory animals, approval by the Institutional Review Board (IRB) or Institutional Animal Care and Use Committee (IACUC) must be obtained prior to starting data collection.

   Second Year, Summer Semester: The student should initiate the research project and begin data collection. The student may consider registering for additional coursework if this would be helpful in expanding the depth of understanding of the research project.

Second Year, Autumn and Spring Semesters: Data collection continues for students in a three-year program.

Note: Students in the 24 month program in Pediatric Dentistry in Plan A should defend their thesis early (May or June) in summer semester. After any necessary revisions are completed, the thesis should be bound and copies provided to the Advisor and committee members. Ideally, the student should convert the thesis into one or more manuscripts that can be submitted to an appropriate journal for publication. Students in Plan B should complete their written comprehensive examination prior to the published deadline and submit their manuscripts to an appropriate journal for publication.

Third Year, Summer Semester: Data collection and analysis should be completed, allowing the student to prepare and submit an abstract for presentation at the American Association for Dental Research meeting and/or the national meeting of their clinical specialty organization.

Note: Students in 27 month programs (Endodontics and Anesthesiology) should defend their thesis prior (Plan A) or complete their comprehensive examination (Plan B) prior to the published deadline for Summer semester.

Third Year, Autumn and Spring Semesters: Students in Plan A should complete their thesis in close collaboration with their Advisor. Ideally, the student should meet with the Master's Examination Committee to present a draft of their thesis for corrections and to organize the thesis defense.

Students in Plan B should collaborate with their Advisor to prepare at least one publication-ready manuscript based on their research. The manuscript(s) should be submitted to Master's Examination Committee for approval.

Third Year, Spring and Summer Semesters: Students in Plan A should defend their thesis prior to the published deadline in Spring semester (for those in the 33 month program in Orthodontics) or early in Summer semester (for those in 36 month programs). After any necessary revisions are completed, the thesis should be bound and copies provided to the Advisor and Committee members. Ideally, the student should convert the thesis into one or more manuscripts that can be submitted to an appropriate journal for publication.

Students in Plan B should schedule their written comprehensive examination during the first half of the appropriate semester and submit their manuscripts to an appropriate journal for publication.

f. **Time Limit.** There is a six-year time limit for completion of the Master of Science program in the College of Dentistry. Under extenuating circumstances, an extension of this time limit may be approved by the GSC. The student must submit a written petition to the GSC requesting an extension prior to the final month of eligibility.

6. Appointment for Category M Graduate Faculty Membership

Membership in the Graduate Faculty is a prerequisite for serving as a graduate student Advisor or as a member of a Master's or Doctoral Examination Committee. To become a member of the Graduate Faculty, faculty members must apply to the GSC and undergo a review. Depending on the credentials of the applicant, membership can be conferred at the Category M (for Master's) or Category P (for Doctoral) level. Regular (appointments at 50 percent time or more) tenure-track and research track faculty with the rank of Assistant Professor or above are eligible for appointment as Category M or P. Regular clinical track faculty members are eligible for appointment as Category M Graduate Faculty. To be eligible for Category M membership, applicants to the Master's Program in Dentistry must have completed and published at least one data-collection research project at a level commensurate with the awarding of a master's degree as the primary or senior author in a peer-reviewed journal in the five-year period preceding their initial appointment.

Emeritus members of the regular faculty holding Graduate Faculty membership at the time of their retirement can request to retain their Graduate Faculty status. The request must be approved by the GSC, the division chair and the Dean of the College. The request must specify a fixed term, not to exceed five years, which can be extended by another request following the same process. In this manner, emeritus faculty can retain the same rights and responsibilities as any other Graduate Faculty member.

When emeritus faculty who do not request to retain Graduate Faculty status retire, or when other Graduate Faculty retire or leave the University, they may continue to serve as advisors for master's students in progress at the time of their retirement or resignation, but may not advise new students. The master's program must submit a request for such faculty to continue graduate committee service to the Graduate School prior to the Graduate Faculty member's retirement or resignation. Under these circumstances, a current Graduate Faculty committee member must be named to serve as the student's co-advisor.

Auxiliary faculty are "persons with adjunct titles, clinical titles, visiting titles, and lecturer titles; also professors, associate professors, assistant professors, and instructors who serve on appointments totaling less than 50 percent to the university" (University Rule 3335-5-19D). Auxiliary faculty members are not eligible for appointment to the Graduate Faculty. Auxiliary faculty may serve on Master's and Doctoral Examination Committees upon petition by the GSC and approval by the Graduate School. Auxiliary faculty may, under extraordinary circumstances, serve as Advisors upon petition by the GSC and approval by the Graduate School.

7. Graduate Program Guidelines and Policies

a. **Graduate Associates.** Most graduate students are eligible for appointment as a Graduate Teaching Associate (GTA) or Graduate Research Associate (GRA).

These are awarded for one year (12 months) at a time and may be renewed on the basis of satisfactory progress in the graduate curriculum, contingent on the availability of funds. Graduate Associate appointments can be terminated for low academic performance, neglect of teaching, clinical or research responsibilities, scientific misconduct, or plagiarism. Graduate Associate performance will be reviewed annually by both the GSC and the Program Director of the clinical specialty program in which they are enrolled. Decisions regarding reappointment and termination are made by the GSC in consultation with the Program Director.

b. **Research with Human Subjects.** Research protocols that require the participation of human subjects are subject to review and oversight by an Institutional Review Board (IRB). The mandate of an IRB is to ensure that adequate protections are in place before humans participate in research. Information is available at http://orrp.osu.edu/irb/. Every research project involving human subjects must be reviewed and approved by an appropriate IRB. Obtaining approval can be a lengthy process. The time and effort required to obtain approval should not be underestimated, and adequate time should be budgeted for the process. The Advisor is responsible for guiding the student through this process and is usually designated as the Principal Investigator in the application to the IRB.

All students and faculty members who participate in the design, conduct, or reporting of human subjects research must be appropriately trained in the protection of human subjects. Additional training in the responsible conduct of research and good clinical practices may also be required by funding agencies and other research sponsors. Ohio State uses the Collaborative Institutional Training Initiative (CITI) web-based human research courses to satisfy the requirement for Ohio State researchers for training in human research subject protection. Initial and continuing education (every 3 years) are required. Additional training and educational programs related to human subject research protections are available.

c **Research with Animals.** The use of animals in University research projects is subject to oversight by the Institutional Animal Care and Use Committee (IACUC). Approval must be obtained before starting the research project. Detailed information is available at http://orrp.osu.edu/iacuc/.

Each student involved in the care and use of animals must obtain a basic level of competency in these areas through participation in either the classroom or in the online Animal Use Orientation Course. This training must be updated no less than every three years. To complete the online course, a score of at least 80% must be obtained on the exam.

d. **Laboratory Safety**. To meet Occupational Safety and Health Administration (OSHA), State of Ohio, and University standards, radiation, laboratory and chemical safety classes are required of all graduate students who work in laboratories in the College of Dentistry. These courses are offered through the Department of Environmental Health and Safety. The student's Advisor will determine if additional

laboratory safety courses are required. More information can be found at http://ehs.osu.edu/Training/rbst.aspx.

e. **Grievance Procedures.** If a graduate student has a grievance, it should be discussed with the appropriate course director, program director, academic Advisor, or other individual directly involved, to seek resolution of the issue. If the matter is not resolved, the graduate student may request a meeting with the Division Head for the given program. If such discussions do not lead to a resolution, and the grievance is related to the Master's Program, the graduate student may submit a written petition to the Chair of the GSC to request a hearing by the full GSC. The GSC will obtain written descriptions of the matters under consideration from the petitioner and other principal parties involved. The GSC will meet as soon as possible, but no later than 30 days after receipt of the complaint, to review this written documentation, and will request all appropriate individuals involved to verbally present their viewpoints. The petitioner may have an advisor present at the GSC meeting. The advisor may only counsel the student and not actively participate in the hearing, unless clarification is needed by the GSC. Each individual witness, or requested witness groups, will meet separately with the GSC. After all witnesses have been heard, the GSC will discuss all testimony and make a decision regarding the petition. The decision requires a simple majority vote of the GSC members present, and will be communicated to the student in writing as soon as possible.

   If the petitioner feels that the grievance has not been satisfactorily resolved by the GSC, a written petition for review of the grievance may be submitted to the Dean of the Graduate School within five business days. The procedures for graduate student grievance reviews are described in Appendix D of the *Graduate School Handbook*.

   If the grievance is related to an advanced clinical education program and is not resolved in a satisfactory manner by the approach outlined above, the Commission on Dental Accreditation provides a mechanism by which a student can file a formal complaint against the program (see http://www.ada.org/314.aspx).

f. **Academic Misconduct.** Graduate students and Graduate Faculty are expected to adhere to the highest ethical and moral standards. The Graduate School at The Ohio State University expects that graduate students will demonstrate responsibility and integrity in pursuing their creative and scholarly interests. The academic enterprise is dependent upon such behavior. Graduate students are responsible for learning about appropriate standards for ethical research and scholarly conduct and for following all university policies related to ethical research and scholarly conduct. The Graduate Student Code of Research and Scholarly Conduct is outlined in Appendix C of the *Graduate School Handbook*.

   All Ohio State University students are subject to the provisions of The Ohio State University Code of Student Conduct. Issues of professional misconduct occurring in the College of Dentistry are managed according to the protocol outlined in the

College of Dentistry Code of Honor and Professional Conduct. Issues of academic misconduct are referred to the Associate Dean for Graduate Studies and Advanced Education for appropriate action. Issues related to scholarly misconduct by graduate students are the responsibility of the Dean of the Graduate School. The Graduate School's policy on investigation of allegations of research misconduct by graduate students is outlined in Appendix C of the *Graduate School Handbook*. The University's policy and procedures concerning misconduct in research or scholarly activities must be followed when responding to allegations of misconduct in research.

8. Program Contacts

Questions related to the Master's program may be addressed to any of the following individuals:

a. **Graduate Studies Committee:** Oversees operation of the program.

Melissa Drum, Chair (Endodontics, term ends 2020)
Ann Griffen (Pediatric Dentistry, term ends 2019)
DoGyoon Kim (Orthodontics, term ends 2018)
Damian Lee (Restorative Science and Prosthodontics, term ends in 2016)
John Walters (Associate Dean for Advanced Educ. & Graduate Studies, *ex officio*)
Graduate Student representative

b. **Associate Dean, Advanced Education and Graduate Studies:** Assists graduate and advanced education program directors and students in all programs; day-to-day oversight of programs.

John Walters (walters.2@osu.edu)

c. **Program Coordinator:** Assists with registration, student records, class schedules and forms

Jessica Maloney (maloney.223@osu.edu), Office of Graduate Studies

9. Appendices

A. Graduate Faculty and Their Research Areas.

Rafat Amar (General Practice and Materials Science)

Homa Amini (Pediatric Dentistry): Risk factors for early childhood caries and disease management protocols; Assessment of caries prevalence rates in special populations including pregnant women, immigrants and children; Identification of barriers associated with utilization of dental services.

Shereen Azer (Restorative Science and Prosthodontics): Esthetic aspects of dental restorative materials and color science, particularly pertaining to ceramic restorations and tooth whitening materials as well as soft tissue esthetics around implant-supported prostheses.

John Bartlett (Biosciences): Dental enamel development and the gene expression program that is required to form teeth; Molecular events that cause dental fluorosis; Cellular interactions that are required for healthy enamel formation.

William A. Brantley (Emeritus faculty, Restorative Science and Prosthodontics): Dental alloys for prosthodontics, orthodontics, and endodontics, including palladium, gold, titanium, and nickel-titanium alloys; New technologies for dental alloys (laser sintering and laser deposition); Characterization of new ceramics for dentistry; Application of materials science principles to dental materials.

Paul S. Casamassimo (Pediatric Dentistry): Oral health disparities for children; Oral health care for persons with disabilities; Policy issues related to the oral health care system for children in the U.S.; Oral-systemic relationships; Morbidity of pain related to early childhood caries.

Hua-Hong Chien (Periodontology): Implant research, focusing on cone beam CT analysis of ridge-split procedure in conjunction with implant placement and the influence of implant platform switching on the composition of perio-implant crevicular fluid during soft tissue healing.

Nancy Clelland (Restorative Science and Prosthodontics): In-vitro stress analysis and prospective clinical studies in the area of implant biomechanics; Comparison of conventional and computer-generated surgical guides.

Bryant Cornelius (Oral and Maxillofacial Surgery and Dental Anesthesiology): Pharmacology and physiology applied to the discipline of anesthesia.

Shareef Dabdoub (Periodontology): Microbial ecology of the oral environment, including: profiling the peri-implant microbiome in health, mucositis, and implantitis; Host-microbial interaction; Resistance and resilience of the microbiome to environmental perturbations; Whole metagenome and RNA-Seq analysis; Data visualization; Visual analytics; Software development; Reproducibility in science.

Toru Deguchi (Orthodontics): Biomechanical and morphological analysis of temporary anchorage devices (TADs) for orthodontic anchorage; Quantitative assessment of orthodontic treatment outcomes; Analysis of the accuracy and usefulness of various intraoral scanners; Analysis of biomechanical characteristics of TADs using artificial bone and pig bone; Role of neuronal substances in pain during orthodontic movement.

Melissa M. Drum (Endodontics): Local anesthesia, intra-operative pain control, pain and anxiety management pre- and postoperatively; Ultrasound diagnosis of infection; Postoperative management and prevention of infection.

Hany Emam (Oral and Maxillofacial Surgery)

Henry W. Fields (Orthodontics): Evaluation of treatment and diagnostic methods; Health literacy and informed consent.

Allen R. Firestone (Orthodontics): Quality of life in orthodontic and combined orthodontic/orthognathic surgery patients; Assessment of facial esthetics using eye tracking and other methods; Non-pharmaceutical approaches to pain control in orthodontics.

Brian L. Foster (Biosciences): Cellular and molecular regulation of tooth development, with a focus on periodontal formation, mineralization of hard tissues, function, and novel regeneration strategies. Factors of interest include enzymes and extracellular matrix proteins involved in development and disease processes of the skeleton and craniofacial region.

Sara Fowler (Endodontics): Local anesthesia and intra-operative pain control.

Anita Gohel (Oral and Maxillofacial Pathology and Radiology): Integration of current imaging modalities like CBCT and microCT to evaluate maxillofacial tissue structure and function including airway; Use of emergent technology in diagnosis of pathological conditions; Evaluation of risks factors for xerostomia; Evaluation of incidence of potential malignant lesions in the dental population.

Steven D. Goodman (Center for Microbial Pathogenesis, Nationwide Children's Hospital): Biofilms; Chronic and recurrent infectious diseases (including caries and periodontitis).

Ann Griffen (Pediatric Dentistry): The human microbiome, especially as it relates to chronic periodontitis and dental caries; Acquisition of the human oral microbiome and its role as part of the human-microbe “super-organism.”

Erin Gross (Pediatric Dentistry)

David L. Hall (General Practice and Materials Science): Bispectral Index monitoring of levels and quality of hypnosis (sedation) during dental procedures.

William M. Johnston (Emeritus faculty, General Practice and Materials ScienceChemical, physical and biological properties of dental biomaterials; Optical properties of esthetic biomaterials and the theoretical bases for determining optical characteristics; Mathematical modeling of properties of biomaterials; Optimization of chemical compositions; Research design.

John R. Kalmar (Oral and Maxillofacial Pathology and Radiology): Use of tissue autofluorescence in the oral screening evaluation of dental patients and in the operating room setting as a means to determine clear surgical margins for precancerous and cancerous oral lesions.

Rachel C. Kearney (Dental Hygiene): Clinical and educational issues in dentistry and dental hygiene. Clinically, I focus on in-office whitening procedures and issues with products, sensitivity, etc. Educationally my focus is on the use of social media in dental education. Inquiries include social media policies, professionalism issues, use in private practice, and incorporation into education.

Kelly Kennedy (Oral and maxillofacial surgery)

Do-Gyoon Kim (Orthodontics): Mechanisms of bone disease, using a mechanobiologic approach.

Ashok Kumar (Pediatric Dentistry): Dental traumatology; Cleft lip and palate; All aspects of clinical pediatric dentistry.

Purnima Kumar (Periodontology): Oral bacterial profiles associated with periodontal health and disease, including a) characterization of subgingival microbial profiles of periodontally healthy smokers and smokers with periodontitis, and b) the role of host genetics on oral bacterial colonization.

Peter E. Larsen (Oral and Maxillofacial Surgery): Translational studies and clinical applications relevant to oral cancer chemoprevention. Studies entail determination of pharmacokinetic properties of chemopreventive formulations prior to clinical use and human clinical trials to determine efficacy of local delivery chemopreventive formulations on premalignant oral lesions.

Binnaz Leblebicioglu (Periodontology): Peri-implant wound healing during early phases of osseointegration; Clinical and histological treatment outcomes following guided bone regeneration procedures; Periodontal health during pregnancy in relation to psychological stress.

Damian Lee (Restorative Science and Prosthodontics): Stress distribution on abutment teeth for removable partial dentures and different clasps; Biofilm formation on junction of acrylic and metal framework on RPDs; Accuracy of impression on dental implants; Bone quality of terminal abutment teeth; Systemic health condition of partially edentulous patients seeking replacement.

Gene Leys (Biosciences): Molecular and population genetics of

periodontitis-associated and other oral bacteria.

Susan R. Mallery (Oral and Maxillofacial Pathology and Radiology): Chemoprevention of oral cancer by natural products, using a continuum of experimental designs that range from cell and animal models to human clinical trials to provide mechanistic insights and determine chemopreventive efficacy, with a focus on controlled-release, local delivery methods.

Angelo Mariotti (Periodontology): Actions and interactions of sex steroid hormones on cellular proliferation and growth in sex accessory tissues and the oral cavity. Issues related to dental health care economics.

Edwin A. McGlumphy (Restorative Science and Prosthodontics): Implant component physical properties, implant prosthodontics and long-term prospective implant clinical trials. Current projects include implant accelerated loading protocols, computer generated guides and intraoral scanning for implant restorations.

Kristin McNamara (Oral and Maxillofacial Pathology and Radiology): Evaluation of direct visual fluorescent examination for early detection of oral cancer and surgical margin delineation in the operating room; Investigation of biomarkers to predict risk of progression of oral dysplastic lesions.

Dennis J. McTigue (Emeritus faculty, Pediatric Dentistry): Behavior guidance techniques in pediatric dentistry and their evolution as a function of parental acceptance and changing societal norms; Management of traumatic injuries to primary and young permanent teeth.

Gregory M. Ness (Oral and Maxillofacial Surgery): Clinical manifestations of oral premalignant disease; Temporomandibular joint disease; Outcomes of ambulatory deep sedation and general anesthesia.

John M. Nusstein (Endodontics): Local anesthesia and pain management; Endodontic irrigation techniques; Nickel-titanium endodontic instruments; Dental trauma management.

Alejandro Peregrina (Restorative Science and Prosthodontics): Accuracy of impression materials; General behavior of all ceramic materials for restoring teeth; Accuracy of chairside oral scanners for impressions; Surface roughness of dental materials; Use of lasers for removal of all-ceramic crowns and their effect on pulpal tissue; Clinical outcomes of different treatment modalities.

Ning Quan (Biosciences): Our lab is focused on studying how the immune system communicates with the central nervous system and the function of the neuroimmune suprasystem. We create and use genetic mouse models to investigate how different types of inflammation signals the CNS via specific cell types. We then study how mental disorders can be produced from immunological activities and how nerve innervation can modulate immune responses.

Alfred W. Reader (Emeritus faculty, Endodontics): Pain control, including all maxillary and mandibular local anesthesia techniques, intraosseous anesthesia, WAND research, mannitol/lidocaine compositions (patented local anesthetic), 4% articaine, preoperative ibuprofen/acetaminophen and nitrous oxide, OraVerse (phentolamine), and red haired patients' anesthetic success.

Peter J. Reiser (Biosciences): Comparative muscle biology, with a specific interest in craniofacial (jaw-closing, extraocular and laryngeal) muscles. A combined physiological- biochemical approach is used to study the function of the rich diversity in contractile protein isoform expression in these muscles among a broad range of vertebrate species.

Fonda G. Robinson (Restorative Science and Prosthodontics): Clinical operating systems and patient outcomes.

Scott Schricker (General Practice and Materials Science): Development of new polymers and monomers to improve dental materials and biomaterials; Development of nanostructured block copolymer surfaces to control protein and cellular interactions.

Robert R. Seghi (General Practice and Materials Science): Statistical fracture mechanics based failure analysis of dental crowns, with particular interest in fracture mechanisms of all-ceramic materials and the influence of the cement interface on failure.

John Sheridan (Biosciences): Brain and body interactions as they relate to modulation of peripheral physiological systems and behavior. This includes neuroendocrine regulation of gene expression in inflammatory and immune responses, and stress- induced susceptibility to infectious and malignant diseases.

Zongyang Sun (Orthodontics): Craniofacial tissue engineering using autologous stem cells and growth factors in a pig model; Craniofacial bone distraction osteogenesis; Alveolar bone reduction after tooth loss - mechanisms and prevention; Impact of functional loading on craniofacial structures; Cone beam CT application in dentistry - advantages and limitations.

Maiko Suzuki (Biosciences): Molecular mechanism of pathophysiology in dental fluorosis focused on stress response (ER stress, oxidative stress), adaptive response and epigenetic regulation.

Dimitris N. Tatakis (Periodontology): Clinical and translational research with an emphasis on periodontal regenerative surgical outcomes, periodontal wound healing, and periodontal-systemic interactions. The research is focused on the host-related aspects of periodontal soft tissue therapy outcomes, on identifying host factors that determine regenerative outcomes and on the interactions between periodontal therapy and systemic biomarkers.

Joseph B. Travers (Biosciences): Taste plays a critical role in the decision to ingest palatable, nutritious food or to reject oftentimes bitter, poisonous substances. The

fundamental neural circuits responsible for this decision are in the brainstem and include neurons in the reticular formation that are necessary for coordinated oromotor function. Our lab is using neuroanatomical, neurophysiological and neuropharmacological approaches to analyze how these circuits process sensory information to switch between multiple behaviors.

Susan P. Travers (Biosciences): Research in my lab investigates how the central nervous system processes sensory signals arising from the mouth. The oral cavity is richly innervated and supplies the organism with information critical to regulating eating and drinking. Our focus is the sense of taste, but we also study oral tactile and thermal sensations because all these modalities interact to give rise to the complex experience of flavor.

John D. Walters (Periodontology): Inflammation and phagocyte biology; Efficacy and pharmacology of antimicrobial and anti-inflammatory agents, focusing on the role of transporters in the distribution of these agents in periodontal tissues; Analytical biochemistry.

Yun Wang (Periodontology): Periodontal regeneration and wound healing, utilizing various biomaterials. Special interests include the outcome of the above-mentioned treatment principles in specific systemic conditions like osteoporosis and diabetes, and the role of estrogen receptors in the periodontium.

Burak Yilmaz (Restorative Science and Prosthodontics): Color science in prosthetic dentistry; Biomechanical aspects of implant prosthodontics.

B. Useful Links

http://www.gradsch.ohio-state.edu The Graduate School homepage, which provides access to the Graduate School Handbook and many resources for students and graduate faculty

http://gradforms.osu.edu/ The Graduate School's electronic form submission system that is used to process master's and doctoral examinations and graduation forms

http://buckeyelink.osu.edu/ Essential Ohio State resources and services for students

http://registrar.osu.edu/staff/bigcal.asp Academic calendar

http://orrp.osu.edu/irb/ Human subjects Institutional Review Board

http://ccts.osu.edu/ The Center for Clinical and Translational Science, with resources and information related to clinical research at OSU.

http://www.randomization.com/ Randomization schemes for clinical studies

http://ular.osu.edu/ University Animal Laboratory Resources

http://www.icmje.org/urm_main.html Uniform requirements for manuscripts submitted to biomedical journals. This is a good source of information about ethical considerations related to carrying out and reporting the results of research projects. It also provides recommendations about specific elements of editing and writing.

Master's Examination Committee Approval Form

Committee members must be members of the Graduate Faculty, unless specifically approved by the Graduate Studies Committee. The committee must include a minimum of three members, with at least one member from the students division and at least one from outside the division.

Student's Name: _____ _____
Last Name First Name Date

Tentative project title:

_____
_____
_____
_____

The following Graduate Faculty members have agreed to serve on the Examination Committee:

Advisor: _____
Last Name First Name
Expertise contributed:

_____
_____
_____

Member 2: _____
Last Name First Name
Expertise contributed:

_____
_____
_____

Member 3: _____
Last Name First Name
Expertise contributed:

_____
_____
_____

Member 4 (optional): _____
Last Name First Name
Expertise contributed:

_____
_____
_____

Submit to Office of Graduate Studies, room 4133 Postle Hall

Research Protocol Approval Form

Student's Name: _____
Last Name First Name

Research protocol title:
_____
_____
_____
_____

The above protocol was reviewed by the Master's Examination Committee and:

__ is approved without condition
__ is approved pending minor changes
__ requires major revision
__ is unacceptable

Advisor Signature: _____ Date: _____

Committee Member Signature: _____

Committee Member Signature: _____

Committee Member Signature: _____

Committee Member Signature: _____

Submit to Office of Graduate Studies, room 4133 Postle Hall

E. Graduate minors (from information published by the Graduate School or programs)

Graduate minors and interdisciplinary specializations are open to any graduate student interested in developing a secondary expertise for as few as 10 hours of graduate-level course work in at least three courses outside the student's home program. Completion of a graduate minor or graduate interdisciplinary specialization is noted on the student's official Ohio State transcript. Contact John Walters (walters.2) for more information.

The **graduate business minor for health sciences program** is offered by the Fisher College of Business. This program originated in 2013 and is offered to students enrolled in the six health sciences schools. The program was designed to provide health care providers with a sound background in business and leadership skills. To date, most students have come from the Colleges of Veterinary Medicine or Medicine. The program includes seven courses (12 credit hours). The courses are scheduled in the evening and can be completed in a single summer (total 12 weeks).

The **graduate minor in public health behavior and promotion** is a new program offered by the College of Public Health to provide master's and doctoral students with "fundamental knowledge about public health behavior and health promotion and the related skills and approaches necessary to plan, implement, and evaluate health-related programs." The program focuses on ways that health behavior and health promotion are influenced by social determinants of health, including race, ethnicity, age, sexual orientation, culture and other factors. Students must have a 3.0 GPA to enter the graduate minor and complete at least 12 credit hours of specific CPH coursework.

The **graduate minor in bioethics** is a new online program offered by the Center for Bioethics and Medical Humanities in the College of Medicine. The minor requires 12 credit hours of BIOETHC coursework (6 core, 6 elective). The program was designed to offer scholarship and training in bioethics and professionalism for graduate students in the health sciences and related fields.

The **graduate minor in anatomy** offers students the opportunity to study one or more of the subdisciplines of human anatomy that may be of direct benefit to their major field of research and provide an added dimension to their scholarly training. Courses are offered in each of the anatomical sciences: gross anatomy, embryology, histology, Neuroanatomy, and biomechanics. The program may benefit any graduate student whose research involves human form and function.

The **graduate interdisciplinary specialization in college and university teaching** is offered by the University Center for the Advancement of Teaching and allows graduate students to engage in a rigorous, structured exploration of theories and practice of university-level teaching, both in general and in their own discipline, and to develop skills and experience that enable them as reflective, scholarly teachers as they prepare to enter the professoriate. This specialization is most appropriate for those who are considering careers as college or university faculty.

F. Dentistry MS program assessment plan and learning goals

Rationale and approach: The Graduate School requires each OSU graduate program to collect data to determine how well the program is meeting its learning goals. The data will be analyzed and used to guide revision of the curriculum so that continuous improvement occurs. The program's approach is to ask each thesis committee member to complete a survey of the student's performance at the time of the thesis defense. In addition, each graduating student will be asked to rate the program's ability to meet its learning goals.

Learning goals

1) Knowledge: Graduate students of the MS program in Dentistry will be able to conduct high-quality research that advances knowledge in biomedical science or clinical therapy. As part of this effort, the students will be capable of accessing and evaluating pertinent scientific literature and comprehend the current state of their fields of study as assessed by successful defense of their theses. Graduate students will also be proficient in the knowledge and skills of their clinical specialty as assessed by employment after graduation from the certification program.

2) Communication: Graduate students of the MS program in Dentistry will be able to discuss or write about discipline-specific issues to students, peers, other health care professionals and the public. Specifically, they will be able to present scholarship related to their thesis in both written and oral formats to a broad audience including their thesis committee as assessed by the preparation and successful defense of their theses.

3) Analytical thinking and application: Graduate students of the MS program in Dentistry will be able to critically evaluate the scientific literature as well as research outcomes with respect to levels of evidence, research design and statistical methods. Students will be able to integrate these analytical skills with discipline-specific knowledge to help solve complex issues related to their fields of study as assessed by the preparation and successful defense of their theses.

4) Practices, values and ethics: Graduate students of the MS program in Dentistry will learn to understand and apply professional values and ethics for responsible conduct of their research, as assessed through the submission of their research proposal and successfully obtaining approval for the proposal by the Institutional Review Board, the Institutional Biosafety Committee, the Institutional Animal Use and Care Committee or other adjudicating body.

Means/Methods of assessment

Direct Measures	***Indirect Measures***
Evaluations of thesis defense by faculty	Student exit surveys
Timely completions of thesis defense (Plan A) or comprehensive exam (Plan B)	Student recognition with research awards
Number of presentations outside the college	% employed within 90 days of graduation
Number of manuscripts submitted	

Faculty evaluation of MS thesis defense

Student: Program Year:
Date of Evaluation: Faculty Evaluator:

Please rate the student's performance in each of the dimensions below

	Outstanding	Good	Satisfactory	Unsatisfactory
KNOWLEDGE – as related to specific program of study				
COMMUNICATION – oral & written as related to specific program of study				
ANALYTICAL THINKING & APPLICATION – critically evaluate literature and apply appropriately to care situations – solve problems related to care issues				
VALUES & ETHICS – apply professional values & ethics particularly as applied to research activities				

Comments:

Master's program exit survey by graduating student

Date of evaluation:
Advanced education program:

Taking into consideration how well your graduate program has prepared you for the next phase of your career, please rate its effectiveness in each of the following areas:

	Outstanding	Good	Satisfactory	Unsatisfactory
DEVELOPMENT OF KNOWLEDGE BASE (as related to your specific program of study)				
DEVELOPMENT OF COMMUNICATION SKILLS (oral & written, as related to your specific program of study)				
DEVELOPMENT OF ANALYTICAL THINKING SKILLS (ability to critically evaluate literature, apply it appropriately, and solve problems related to care issues)				
APPLICATION OF PROFESSIONAL VALUES & ETHICS to clinical care and research activities				

Future plans: □ Private practice □ Academic position □ Consultant □ Military position
□ Hospital position □ Other _____

Time frame for starting the above: □ Immediately □ Within 3 mo □ 6 mo □ 12 mo

Comments are welcomed: