ORAL AND CRANIOFACIAL SCIENCES

The Interdisciplinary Ph.D. program is no longer accepting applications. The Civil Engineering, Computer Science, Economics, Education, Electrical and Computer Engineering, Humanities, Mechanical Engineering, and Natural Sciences Ph.D. programs are now open for applications.

Applicants specifically interested in Oral and Craniofacial Sciences should apply to the Natural Sciences Ph.D. Please inquire to umkcsgs@umkc.edu with any questions.

Discipline Coordinator

Contact the Department of Oral and Craniofacial Sciences for Coordinator information.

Oral and Craniofacial Sciences is a discipline in the Interdisciplinary Ph.D. (https://catalog.umkc.edu/colleges-schools/graduate-studies/interdisciplinary-phd-program/) Program administered by the School of Graduate Studies.

Note: The discipline-specific requirements listed here are *in addition* to the requirements listed in Interdisciplinary Ph.D. Application Procedure and Minimum Criteria for Admission and Minimum Interdisciplinary Ph.D. Academic Regulations and Degree Requirements.

Overview

In concert with the School of Graduate studies, the Department of Oral and Craniofacial Sciences offers a doctoral program that must include the in-depth study of at least two disciplines. Students in the Oral and Craniofacial Sciences program can choose to participate in any of the department's three areas of research focus:

- ***Biomaterials/Bioengineering of Biological Tissues and Replacements***
  The overall goal of this program is to apply an integrated approach involving innovative computer modeling and organic synthesis, novel biocompatibility evaluation, comprehensive materials characterization, and mechanistic development of improved dental biomaterials. One component of this program is an engineering component that emphasizes micro- and nano-structure/property characterization of natural biomaterials such as bone, dentin, and enamel as a tissue engineering approach to the development of replacement materials.
- ***Mineralized Tissue Biology***
  This program is aimed at determining basic biological mechanisms and the cause and treatment of disease of bone and teeth during development and in the adult. Approaches include the use of basic in vitro methods combined with genomics, proteomics, bioinformatics, and transgenic technology.
- ***Translational and Clinical Research***
  Translational and clinical research involves results from clinical observations translating into basic research and incorporates basic research findings into clinical assessment and practice. The identification, characterization and synthesis of materials for clinical use requires the combined efforts and expertise of clinical scientists, materials scientists, biostatisticians, bioengineers, geneticists, chemists, physicists, and computer scientists.

Program

The Interdisciplinary Ph.D. program is composed of a significant supervised research effort along with courses in areas such as biomaterials, research design and methodology, statistics, grantsmanship, biochemistry, proteomics, genomics, histology, and pathology. The primary didactic effort will be in oral and craniofacial sciences (biomaterials/bioengineering of biological tissues and replacements, mineralized tissue biology, or translational/clinical research) and the student will select a secondary area of concentration from other Interdisciplinary Ph.D. disciplines.

Duration

The length of the program is dependent on the academic background and abilities of the applicant and may vary from three to five years. The program culminates with an Interdisciplinary Ph.D. in Oral and Craniofacial sciences degree and the designated co-discipline(s).

Student Learning Outcomes

The developed program of study will meet the student's individual needs and research interests, satisfy discipline-specific requirements, and assure upon graduation that students are able to:

1. Demonstrate a deeper understanding of the link between scientific research and clinical health care practice
2. Conduct thorough literature reviews based on an understanding of periodical databases and scholarly journals in the health sciences; have the aptitude to assess the validity of literature and determine how it may be applied in both research and clinical settings
3. Demonstrate the ability to conduct original research projects, drawing on an understanding of the current literature, appropriate study design, methodologies, and data analysis
4. Develop the capability to produce written materials that are clear, well-organized, insightful, and drawn from evidence-based research

5. Employ the communications skills needed to successfully convey important scientific and clinical concepts in oral presentations and communications
6. Apply professional ethics with the highest standards of integrity in all facets of research

Eligibility

An applicant must meet the minimum general requirements for admission to Interdisciplinary Ph.D. study at UMKC and must satisfy grade point average requirements as stated in the admission requirements section of the Academic Regulations and Information of Doctor of Philosophy Studies at the University of Missouri-Kansas City
. To advance to candidate status, the student must successfully complete written and oral Comprehensive Examinations relevant to their primary and co-discipline(s).

Discipline-Specific Admission Requirements

In addition to the general minimum requirements for admission to interdisciplinary Ph.D. study, an applicant must hold either (1) a baccalaureate degree, (2) an M.S degree, or (3) a D.D.S. or equivalent degree. In general, an applicant will be expected to have a minimum cumulative GPA of 3.0 based on a 4.0 scale for previous education programs, including dental school (if applicable).

Applicants must also meet the following minimum GRE requirements:

- Quantitative: 150
- Verbal: 155
- Analytical Writing: 4.0

The TOEFL is required for all international applicants, who must have a score of at least 80. An IELTS score of 6.0 or above may be accepted in place of the TOEFL.

All application materials should be submitted prior to March 1 for students wishing to begin their study in the fall semester; however, applications will be accepted throughout the year. Evaluation criteria include the following:

- Transcripts. Analysis of transcripts from all prior institutions is required.
- Letters of recommendation. Three letters of recommendation are required from current or former teachers who are familiar with the applicant's past achievements and research ability.
- Personal statement from applicant. The applicant must submit a letter describing why he or she is interested in pursuing an Interdisciplinary Ph.D. study in oral and craniofacial sciences, how the experience of the program may be used by the candidate in the future, and a list of potential research interests.
- Interviews. Interviews are not required; however, interviews are preferred and will be arranged upon the candidate's request. Successful interviews may enhance the candidate's chance of acceptance.

Suggested Compatible Co-disciplines

Biomedical and Health Informatics (https://catalog.umkc.edu/colleges-schools/graduate-studies/biomedical-health-informatics/), Cell Biology and Biophysics (https://catalog.umkc.edu/colleges-schools/graduate-studies/cell-biology-biophysics/), Chemistry (https://catalog.umkc.edu/colleges-schools/graduate-studies/chemistry/), Computer Networking and Communication Systems (https://catalog.umkc.edu/colleges-schools/graduate-studies/telecommunication-computer-networking/), Computer Science (https://catalog.umkc.edu/colleges-schools/graduate-studies/computer-science/), Electrical and Computer Engineering (https://catalog.umkc.edu/colleges-schools/graduate-studies/electrical-computer-engineering/), Engineering (https://catalog.umkc.edu/colleges-schools/graduate-studies/engineering/), Molecular Biology and Biochemistry (https://catalog.umkc.edu/colleges-schools/graduate-studies/molecular-biology-biochemistry/), Pharmacology (https://catalog.umkc.edu/colleges-schools/graduate-studies/pharmacology/), Physics (https://catalog.umkc.edu/colleges-schools/graduate-studies/physics/)

Core Program Requirements

The required minimum core curriculum for students with Oral and Craniofacial Sciences as a discipline will consist of a minimum of nine credit hours in Oral and Craniofacial Sciences. See minimum course requirements below. The student's supervisory committee may require additional courses for an Interdisciplinary Ph.D. program which includes the department of Oral and Craniofacial Sciences as the primary discipline or as a co-discipline. Ph.D. students with Oral and Craniofacial Sciences as their primary unit must either complete these courses at UMKC or must have completed equivalent coursework at approved institutions at the time of their admission to the Interdisciplinary Ph.D. program. Students are referred to other sections of the current UMKC general catalog for listings of appropriate graduate-level courses. The curriculum requirements also include a minimum of 3 credit hours of ethics training.

Minimum Coursework Requirements

The Discipline Coordinator/OCS Program Director will serve as the student's academic advisor for Oral and Craniofacial Sciences Interdisciplinary Ph.D. students. In accordance with the general requirements for the Interdisciplinary Ph.D. program, a Ph.D. student must prepare a coursework plan of

study in conjunction with the discipline coordinator/program director and co-discipline coordinator. A student's plan of study must include coursework in Oral and Craniofacial Sciences as well as in at least one other discipline.

Coursework must satisfy all discipline-specific requirements and may include additional courses as appropriate to the student's research focus. Course selection will be made in conjunction with the Department of Oral and Craniofacial Sciences Director of Graduate Research Programs and the General requirements are listed below:

- The Plan must include coursework from all of the student's disciplines
- No more than 60 percent of the total coursework taken at UMKC and included on the Ph.D. Plan of Study, exclusive of dissertation hours, may be from any one discipline
- Coursework from disciplines other than the ones to which the student has been admitted may be included on the Coursework Plan of Study and counted in the total percentage
- No more than 25 percent of the total coursework may be from disciplines not formally participating in the Interdisciplinary Ph.D. Program
- The Plan must include at least 30 didactic hours beyond the baccalaureate degree, exclusive of dissertation research hours, in courses taken at UMKC or in courses taken at another institution which are approved for transfer by the Discipline Coordinator/Program Director
- The Plan must include a minimum of 9 credit hours, exclusive of dissertation research hours, in a co-discipline area to which the student has been admitted
- The Plan must include at least 12 hours of dissertation credits

Code	Title	Credits
Required Core Curriculum		
BIO-SCI 5751	Elements of the Scientific Method	1-2
BIO-SCI 5752	Research Methods in Oral and Craniofacial Sciences	1-5
RES-ME 5700	Introduction to Research Methodology	2-3
RES-ME 5704	Introduction to Biostatistics	2-3
Dissertation		
No less than 12 credits of the following are required:		12
OR-BIO 5699	Dissertation Research	
Applicable Courses		
Examples of additional courses applicable to the program:		
BIO-SCI 5700	Biomaterials Teaching	
BIO-SCI 5710	Genetics and Biochemistry of Cranial Facial Biology	
BIO-SCI 5739	Biomaterials for the Dental Specialist	
BIO-SCI 5740	Oral Pathology	
BIO-SCI 5742	Biomaterials for the Restorative and General Dentist	
BIO-SCI 5743	Advanced Seminar in Dental Biomaterials	
BIO-SCI 5747	Research Instrumentation Used in Dental Biomaterials	
BIO-SCI 5750	Special Problems in Dental Biomaterials	
BIO-SCI 5759	Special Problems in Pharmacology	
BIO-SCI 5760	Physiology of Oral Mineralized Tissues	
BIO-SCI 5790	Directed Research In Oral and Craniofacial Sciences	
BIO-SCI 5802	Immunopathology	
BIO-SCI 5805	Molecular Biology of Oral Microflora	
BIO-SCI 5830	Structural Characterization of Dental Biomaterials	
MEDB 5561	Responsible Conduct of Research	

Departmental Research Orientation

Enrollment in BIO-SCI 5751 required

- Interdisciplinary Ph.D. students will select and rotate through a minimum of four laboratories in the Department of Oral and Craniofacial Sciences conducting a short research project in each. At the end of the semester, a report is required reviewing the research project and instrumentation in each laboratory. Students are also required to attend the weekly Department of Oral and Craniofacial Sciences Seminar Series and the monthly Professional Development Seminar Series. Research presentations cover a variety of biological, engineering and behavioral science disciplines relevant to oral science education and the oral health care profession. Presentations will be by faculty, students, and invited guest lecturers.

Enrollment in BIO-SCI 5752 required

- As the student identifies a research focus for the dissertation project, they will begin reviewing the literature and relevant instrumentation in conjunction with a selected research advisor.

Seminar Series

- Graduate students are expected to attend the weekly Department of Oral and Craniofacial Sciences Seminar Series and the monthly Professional Development Seminar Series

Thesis and Dissertation Defense Exams

- Graduate students are expected to attend all thesis and dissertation defense exams

Other Discipline-Specific Special Requirements

Dissertation Research

In accordance with general Interdisciplinary Ph.D. program requirements, each student with Oral and Craniofacial Sciences as the primary discipline must submit a dissertation proposal, prepared in consultation with the student's dissertation chair, which describes an interdisciplinary program of original research on a significant problem in Oral and Craniofacial Sciences. The proposal will be reviewed by the student's Ph.D. supervisory committee. The student may be required to revise and resubmit the proposal to the supervisory committee. A copy of the accepted proposal will then be forwarded to the School of Graduate Studies.

The student must provide evidence that a substantial portion of the dissertation will be submitted for publication to refereed journals. Such proof may be in the form of a manuscript in preparation for submission or a submitted manuscript. The student must submit the complete dissertation, in electronic form, to his or her faculty advisor for review and preliminary approval at least eight weeks before the expected date of graduation.

Appeals

In the event of disputes or special requests concerning a student's Ph.D. program, written appeals or documentation must first be submitted to the student's supervisory committee. If a resolution of the problem cannot be affected at that level, the written appeals process takes effect.

Academic Retention

A 3.0 or better grade-point average is required of all work applicable to the Interdisciplinary Ph.D. program. A Ph.D. student with oral and craniofacial sciences as a discipline is subject to termination from the Interdisciplinary Ph.D. program if: (1) his or her grade-point average falls below 3.0; (2) more than four hours of C (2.0) grades are received; or (3) any grade of D or F is received.

A recommendation for termination from the program will be made by the student's dissertation chair to the program director. The next level of review would be the department chair, associate dean for research and graduate programs, and then the Interdisciplinary Ph.D. executive committee and the Dean of the School of Graduate Studies.

Comprehensive Examination Guidelines

A Comprehensive Examination will be administered to all students enrolled in the Interdisciplinary Ph.D. program whose subject emphasis area is Oral and Craniofacial Sciences. The examination includes both written and oral components. Content of the Comprehensive Examination will be tailored to the student's field of research interest and prepared with input from all members of the student's supervisory committee.

Oral and Craniofacial Sciences as a Co-discipline

- The Plan of Study must include a minimum of 9 approved credit hours, exclusive of dissertation research hours, in the Oral and Craniofacial Sciences co-discipline area
- At least one member of the Department of Oral and Craniofacial Sciences doctoral faculty must serve on the dissertation committee
- The Department of Oral and Craniofacial Sciences Graduate Program Director will serve as the interim advisor to co-discipline Interdisciplinary Ph.D. students.

Students will select courses applicable to their program from the following list with guidance from the Department of Oral and Craniofacial Sciences Director of Graduate Research Programs.

Code	Title	Credits
BIO-SCI 5751	Elements of the Scientific Method	1-2
BIO-SCI 5752	Research Methods in Oral and Craniofacial Sciences	1-5
RES-ME 5700	Introduction to Research Methodology	2-3
RES-ME 5704	Introduction to Biostatistics	2-3
BIO-SCI 5710	Genetics and Biochemistry of Cranial Facial Biology	2

BIO-SCI 5739	Biomaterials for the Dental Specialist	1
BIO-SCI 5742	Biomaterials for the Restorative and General Dentist	2
BIO-SCI 5743	Advanced Seminar in Dental Biomaterials	1-2
BIO-SCI 5760	Physiology of Oral Mineralized Tissues	2
MEDB 5561	Responsible Conduct of Research	3