

## **Program Description**

### **Master's of Science Degree in Cariology and Operative Dentistry to Be Offered by Indiana University School of Dentistry at Indiana University Purdue University Indianapolis**

#### **1. Characteristics of the Program**

- a. Campus Offering Program: Indiana University Purdue University of Indianapolis (IUPUI)
- b. Scope of Delivery: IUPUI is the Specific Site for the MSD in Cariology and Operative Dentistry
- c. Mode of Delivery: Classroom, Blended, Online
- d. Other Delivery Aspects: Clinic, Laboratory
- e. Academic Unit Offering Program: Indiana University School of Dentistry (IUSD)

#### **2. Rationale for the Program**

- a. Institutional Rationale (Alignment with Institutional Mission and Strengths)

Dental caries remains the most common chronic disease of childhood and affects all ages, with up to 90% of adults expected to experience some level of disease during their lifetime. Although largely preventable, dental caries has been traditionally treated by removing the affected dental tissue and placing restorations (i.e. filling cavities). With the paradigm shift to a preventive model of disease management, this restorative model is no longer considered the most effective or the most humanistic means of managing the disease. Alternative therapies focused on preventive measures must be implemented to stop the initiation and/or reverse the progression of dental caries, prior to the need for a restoration. However, the transition in philosophy of prevention followed by timely restorative care only when strictly necessary has been slow to be adopted in dental education and clinical practice. Therefore, there is a need for a graduate program incorporating current evidence-based scientific knowledge related to Cariology and the application of sequential preventive and restorative techniques, in order to achieve and maintain dental health status at the individual and population level. The nature of the proposed program in Cariology and Operative Dentistry can be summarized in a statement released by the American Dental Education Association (ADEA), in the 'ADEA Policy Statements: Recommendations and Guidelines for Academic Dental Institutions' (Journal of Dental Education, 2011): "ADEA supports and encourages the education of students, professionals, and the public on behaviors that will

promote health by preventing and managing dental caries based on proper disease diagnosis, caries risk assessment, and prognosis, including preventive oral health care measures, proper nutrition, and the management of dental caries utilizing risk-based, minimally invasive nonsurgical and surgical modalities, as dictated by the best evidence available.”

The Master’s Program in Cariology and Operative Dentistry is being proposed to replace the existing Master’s Programs in Preventive Dentistry and Operative Dentistry, Indiana University School of Dentistry. The Preventive Dentistry program is offered by the Department of Preventive and Community Dentistry, which has a long-standing association with the research intensive Oral Health Research Institute. The Institute has been responsible not only for developing many of the past and current leaders in Cariology, but also for foundational advances in Cariology, such as the first fluoridated toothpaste. Similarly, the Operative Dentistry program has a recognized tradition of excellence in the training of dental specialists with enhanced dental restorative skills, and is renowned internationally for developing its residents into outstanding clinicians, educators, and leaders in academia and organized dentistry. The new program proposes a common curriculum and research agenda that will integrate the expertise of the existing programs into cutting-edge clinical, research and community practices that would not be otherwise achieved. Such a combined approach will be unique in graduate dental education and will identify this program as the leader of its type in the United States.

The values and goals of the program are closely aligned with the vision of the IUSD of becoming one of the best dental schools of the 21<sup>st</sup> century. The program will contribute to the IUSD missions of advancing the oral and general overall health of the people of the State of Indiana and others worldwide through excellence in teaching and learning, research and creative activities, patient care, civic engagement and service.

#### *Appendix 1: Institutional Rationale*

##### **b. State Rationale**

The proposed program recognizes that the evolution in the practice of dentistry worldwide must be centered in preventive concepts and based upon a strong scientific foundation. This program also recognizes the importance of research to advance the development of preventive and operative therapies and procedures in the clinical practice. It will provide the students with research mentorship from established faculty members and research programs, in a well-established environment, as supported by the laboratories and clinic at the Oral Health Research Institute. The seamless interaction between research and clinical practice will not only provide a higher quality student education, but also increase the chances for completion of the program in the proposed time. Students receiving an

MSD degree from this program will be able to work as dentists in private practice and health institutions or as educators and researchers, favorably increasing their chances of a meaningful career as practitioner, academician or researcher. The MSD program in Cariology and Operative Dentistry is specifically designed to provide the necessary skills in these areas and will enable graduates who have a desire to perform research to secure grant funding, having a positive impact on the state's economy. This unique and cutting edge program will also attract out of state students benefiting the state, providing services to our residents for 3 years or longer. Finally, outcomes of our MSD student research may lead to new discoveries and patents, which may set the standard for care.

- c. Evidence of Labor Market Need
  - i. National, State, or Regional Need

Graduates from this program can serve a need for educators and researchers in the area at the state level, mostly at the IUSD. As with most dental schools, IUSD is faced with the aging of its faculty and a need to develop faculty who are well versed in both disease prevention and restorative care. There is also a strong need for qualified professionals in the national (Armed Forces, Public Health Dentist) and international markets.

- ii. Preparation for Graduate Programs or Other Benefits

The MSD in Cariology and Operative Dentistry will prepare students to continue their education at the graduate level. Graduates of this program will be able to pursue PhD degrees in Dentistry if they do not choose to enter into the labor market.

- iii. Summary of Indiana Department of Workforce Development (DWD) and/or U.S. Department of Labor Data

According to the US Bureau of Labor Statistics, the employment of dentists is expected to grow by 21% from 2010 to 2020, which is faster than the average for all occupations (18%). Similarly, the Indiana DWD estimates an increase of 25% during the same period. Dentists will continue to see an increase in public demand for their services as studies continue to link oral health to overall health. Therefore, graduates from the proposed MSD program will be able to serve not only as qualified dentists, but also as qualified educators. Again, the emphasis on disease prevention will allow our graduates to have a dramatic impact on oral health at a time when cost-effective care is synonymous with disease prevention.

*Appendix 2: Summary of Indiana DWD and/or U.S. Department of Labor Data, Detail*

iv. National, State, or Regional Studies

In addition to the national and global positive jobs outlook for dentists and dental researchers and professors, it should be noted that an MSD degree in Cariology and Operative Dentistry is lacking in the U.S. Only traditional Operative Dentistry MS or MSD programs are available, and in few U.S. dental schools.

Oral health workforce needs of Indiana face several major factors; among those a need for highly qualified preventive oriented dentists has been noted. The Health Resources and Services Administration (HRSA), part of the U.S. Department of Health and Human Services, awarded a one-year workforce development grant to the Indiana State Department of Health (ISDH). ISDH collaborated with the Indiana University School of Dentistry (IUSD) and the Indiana University Center for Health Policy (CHP) to develop a strategic plan designed to improve the State's oral health workforce and service delivery infrastructure for the underserved. The resulting plan included the following recommendations: GOAL 1 - Develop a competent and diverse workforce that can provide adequate access to care for all Indiana resident; GOAL 4 - Educate the public and raise awareness of oral health issues (using best available scientific evidence and guidelines endorsed by federal agencies); GOAL 5 - Assist communities with Water Fluoridation Program; GOAL 6 - Increase community-based oral disease prevention programs. A cadre of dental professionals with specialized training in the prevention of dental diseases is essential to meet these recommendations, which have been designated as priorities. The proposed program would provide our graduates with the tools to become effective, preventive oriented dental professionals. Therefore, a program as proposed would be extremely responsive to the labor market needs of Indiana as outline in its Strategic Oral Health Plan.

*Appendix 3: National, State, or Regional Studies*

v. Surveys of Employers or Students and Analyses of Job Postings

There are no formal surveys or analyses done on job postings relevant to the program. However, there are examples of job positions currently (or recently) posted that may illustrate the need for professionals with proper training in Cariology and Operative Dentistry.

*Appendix 4: Job Postings*

vi. Letters of Support

The responses we have received enthusiastically endorse the Master's Program in Cariology and Operative Dentistry. Several persons have commented that they view the proposed program as a natural extension of

IUSD efforts to strengthen graduate education in both Cariology and Operative Dentistry, with emphasis in preventive concepts and strong research.

*Appendix 5: Letters of Support*

**3. Cost of and Support for the Program**

a. Costs

i. Faculty and Staff

Full-time IUSD faculty primarily from the recently created Department of Cariology, Operative Dentistry, and Dental Public Health (encompassing both former Departments of Preventive and Community Dentistry and Restorative Dentistry) will be responsible for the teaching and research activities of the MSD program. It is predicted that core faculty members of these departments will dedicate between 30 and 60% of their time to the MSD program; while others between 5 and 10%, depending on the teaching and mentoring activities. Teaching support will also be provided by faculty members from other departments at IUSD.

*Appendix 6: Faculty and Staff*

ii. Facilities

No new renovation of existing facilities will be needed to offer the MSD in Cariology and Operative Dentistry. No new capital projects or leasing of new space will be required.

*Appendix 7: Facilities*

iii. Other Capital Costs (e.g. Equipment)

No new equipment will be purchased to offer the MSD in Cariology and Operative Dentistry; thus, it will not impact other capital costs within the university.

*Appendix 8: Other Capital Costs*

b. Support

i. Nature of Support (New, Existing, or Reallocated)

Support for this program, including faculty who will teach and advise students, will come from the IUSD. Most of the faculty are already involved

with the existing independent programs (MS/MSD in Preventive Dentistry and MSD in Operative Dentistry), which will no longer exist after the proposed combined program is in place. Therefore, there will be no need to create new sources of funding for this program. By combining the programs, some of the courses currently offered in the curricula of both programs will be combined. This will permit an efficient and economical use of facilities and faculty.

ii. Special Fees above Baseline Tuition

No special fees above baseline tuition will be needed to support this program.

#### **4. Similar and Related Programs**

a. List of Programs and Degrees Conferred

i. Similar Programs at Other Institutions

Since 2005, IUSD has offered a 3-year combined program in Operative/Preventive Dentistry. This proposed program will preserve the best of both existing programs to allow a full integration of Preventive Dentistry with Operative Dentistry.

ii. Related Programs at the Proposing Institution

No similar program is offered at the Proposing Institution.

b. List of Similar Programs Outside Indiana

There are no programs in other US institutions similar to the one proposed. The closest would be the Operative Dentistry programs offered in the schools as listed below:

- University of Michigan School of Dentistry - Graduate Program in Restorative Dentistry (3 yr)
- Boston University - MSD in Operative & Esthetic Dentistry (3 yr)
- Nova Southeastern University - Operative Dentistry (3 yr)
- University of North Carolina - Operative Dentistry (3 yr)
- University of Southern California - Certificate in Operative Dentistry and Master of Science in Craniofacial Biology (3 yr)
- University of Iowa - MS Graduate Program in Operative Dentistry (3 yr)

c. Articulation of Associate/Baccalaureate Programs

N/A

*Appendix 9: Articulation of Associate/Baccalaureate Programs*

d. Collaboration with Similar or Related Programs on Other Campuses

There are no collaboration arrangements in place to support the program.

**5. Quality and Other Aspects of the Program**

a. Credit Hours Required/Time To Completion

A total of 64.5 credit hours are required to complete the MSD degree in Cariology and Operative Dentistry. The curriculum consists of:

**Required core courses** (64.5 credit hours, including master's thesis credit hours): All students must take a common core of courses, as listed in Appendix 10.

**Elective courses:** Elective subjects may be selected based on the student's educational objectives.

**Master's thesis** (7 credit hours): A total of 7 hours must be in research, additional research credit cannot be used toward fulfillment of the degree.

In order to receive an MSD in Cariology and Operative Dentistry, students must complete all required didactic and clinical course work and successfully pass an oral and written qualifying examination. They must also complete a research project, and write and successfully defend a master's thesis. A **Certificate in Cariology and Operative Dentistry** may be offered to students completing all the requirements listed above, but not pursuing the Master's thesis. The MSD program will be completed in 3 years, while the certificate option may be finished in 2 years, as the third year is primarily focused on the research project for the Master's thesis.

Students must maintain a 3.0 grade point average to remain in good standing in the program. The curriculum includes courses that currently exist on the IUPUI campus. Faculty members who teach existing courses in other departments have been contacted and will allow our MDS students to enroll in their courses.

*Appendix 10: Credit Hours Required/Time To Completion*

b. Exceeding the Standard Expectation of Credit Hours

N/A

*Appendix 11: Exceeding the Standard Expectation of Credit Hours*

### c. Program Competencies, Learning Outcomes and Assessment

The goal of the MSD Program in Cariology and Operative Dentistry is to produce graduates who will have a sound didactic, clinical and scientific basis to teach Cariology and Operative Dentistry at the pre- and post-doctoral levels, and to provide patient care to prevent and manage dental caries, including all aspects of Operative Dentistry. The program will stress both basic and advanced concepts of Preventive and Operative Dentistry focusing on dental caries, and their application to patients within a total patient care concept. Learning the skills to conduct clinical and laboratory research will also be emphasized, and a thesis based on an original research project will be required. A minor in dental materials will also be required. Elective course work could be selected from a large number of available graduate level courses offered by IUPUI. Thus, there will be considerable flexibility in the curriculum permitting a program appropriate to the student's educational objectives and background.

Graduates from this program are expected to demonstrate competency in the following major areas: Cariology knowledge base\*; caries risk assessment, diagnosis and management\*; caries preventive (non-surgical) therapy\*; caries restorative (surgical) therapy\*; advanced restorative techniques; research; teaching/education; and evidence-based decision-making and ethical behavior.

*[\* based on the European Core Curriculum in Cariology (Schulte et al., 2011; Eur J Dent Educ 15 (Suppl 1), 9-17, 2011)]*

#### **1. Cariology knowledge base competency**

Cariology competency refers to the thorough understanding of the basic and applied clinical sciences to recognize caries and other dental hard tissue disorders and make decisions about their prevention and management in individuals and populations.

The **specific learning outcome** for this competency is:

- Ability to define terms, explain and appraise principles, concepts, and theories related to the development, diagnosis, prevention and treatment of dental caries and other dental hard-tissue disorders

The **method of learning acquisition** involves:

- Didactic course work
- Attendance and active participation in classes, seminars and labs
- Clinical activities

The **assessment of the knowledge and acquired skills** is done by:

- Ability to successfully pass all required courses and qualifying examinations

#### **2. Caries risk assessment, diagnosis and management competencies**

These competencies refer to the ability to identify and estimate the probability for a patient to develop new caries (or other dental hard tissue) lesions or to



have progression of existing ones. It also involves proper diagnosis, risk assessment, and prognosis, including preventive oral health care measures, proper nutrition, and management utilizing risk-based, minimally invasive nonsurgical and surgical modalities, as dictated by the best evidence available.

The **specific learning outcomes** for these competencies are:

- Recognition of the epidemiology of dental caries (or other dental hard tissue lesions) at the population level, identifying high risk groups
- Differentiation of dental caries at the individual level applying traditional and technology-based methodologies
- Analysis and appraisal of the risk factors of dental caries (or other dental hard tissue lesions)
- Assessment of caries (or other dental hard tissue lesions) risk status based on the risk indicators
- Differentiation of dental caries from other dental hard tissue disorders, including erosive wear, non-erosive wear and fluorosis

The **method of learning acquisition** involves:

- Didactic course work
- Attendance and active participation in classes, seminars and labs
- Clinical activities

The **assessment of the knowledge and acquired skills** is done by:

- Ability to successfully pass all required courses and qualifying examinations

### ***3. Preventive (non-surgical) therapy competency***

This competency is related to the non-surgical management of caries, and other dental hard tissues with an emphasis on long-term preventive care planning and maintenance, for the prevention of the development of new dental hard tissue diseases or progression of existing ones. It involves the specific knowledge of preventive care strategy at the individual and community levels.

The **specific learning outcomes** for this competency are:

- Development, implementation and assessment of the plan for caries (and other dental hard tissue disorders)
- Discrimination of the preventive/therapeutic agents available for use in caries (and other dental hard tissue disorders) management
- Comprehension the role of oral hygiene measures in caries (and other dental hard tissue disorders) management
- Understands the role of oral health counseling and motivation plan
- Evaluation of current evidence regarding effectiveness and use of dental sealants

The **method of learning acquisition** involves:

- Didactic course work
- Attendance and active participation in classes, seminars and labs

- Clinical activities

The **assessment of the knowledge and acquired skills** is done by:

- Ability to successfully pass all required courses and qualifying examinations
- Direct assessment of student progress in the clinic

#### **4. Surgical therapy competency**

This competency is related to the surgical management of caries and other dental hard tissue disorders, with an emphasis on long-term preventive care planning and maintenance. It encompasses the knowledge of dental restorative concepts, procedures and materials, as well as their clinical applications. It also involves demonstration of proficiency in restorative skills and decision-making.

The **specific learning outcomes** for this competency are:

- Ability to decide when surgical intervention is appropriate for dental caries lesions and other dental hard tissue disorders with an understanding of the consequences and prognosis of such decisions
- Execution of appropriate surgical treatment, focusing on preservation of sound tooth structure
- Restoration of form, function and esthetics of dental hard tissue, while promoting oral health
- Understanding of dental materials science, clinical indications, and appropriate selection and use of restorative materials

The **method of learning acquisition** involves:

- Attendance and active participation in classes, seminars and labs
- Clinical activities

The **assessment of the knowledge and acquired skills** is done by:

- Ability to successfully pass all required courses and qualifying examinations
- Direct assessment of student performance during clinical patient care.

#### **5. Advanced restorative techniques competency**

This competency is related to the treatment of dental hard tissue disorders and conditions, with emphasis on the more complex cases and advanced treatment modalities. This also includes procedures to improve esthetics and the restoration of dental implants.

The **specific learning outcomes** for this competency are:

- Ability to assess patient treatment needs, formulate a treatment plan, and select appropriate treatment options based on the demands of the case.
- Execution of appropriate treatment, focusing on preservation of sound tooth structure.
- Restoration of form, function and esthetics of dental hard tissues, while promoting oral health.

- Advanced understanding of dental materials science and clinical indications and use of current restorative materials and treatment modalities.
- Enhanced clinical expertise and critical thinking enabling the treatment of complex restorative cases.
- Integration with other clinical disciplines such as Periodontology, Prosthodontics, Endodontics and Orthodontics.

The **method of learning acquisition** involves:

- Attendance and active participation in classes, seminars and labs
- Mentored clinical patient care

The **assessment of the knowledge and acquired skills** is done by:

- Ability to successfully pass all required courses and qualifying examinations
- Direct assessment of student performance during clinical patient care.

## ***6. Research competency***

Competency in research relates to the ability to understand the concepts of research program, collaboration and all the essential aspects associated to the development of a research project in the area of Cariology and Operative Dentistry, involving identification of research question, literature review, hypothesis formulation, designing of the experiment, protocol development, conduction of the experimental phase, data collection, data analysis, data reporting, as well as thesis writing and research manuscript publication.

The **specific learning outcomes** for this competency are:

- Comprehension of the different methodologies and techniques related to research in Cariology and Operative Dentistry
- Development, construction and evaluation of research hypotheses aimed at furthering knowledge in the field
- Preparation of research manuscripts and submission to peer-reviewed journals for publication

The **method of learning acquisition** involves:

- Direct mentoring by student's mentor
- Mentoring by student's research committee

The **assessment of the knowledge and acquired skills** is done by:

- Direct assessment by faculty (student research committee and IUSD Research Subcommittee) on thesis proposal
- Thesis writing and defense
- Manuscript writing and submission for publication

## ***7. Teaching/Education competency***

Competency in teaching and education in Cariology and Operative Dentistry relates to the ability to express ideas and facts effectively in writing and speaking; to comprehend, interpret and analyze texts; and to use the best

available evidence to support it. It also involves the ability to register clinical cases and to the creation and distribution (oral, written and electronic) of didactic material focusing on oral health for patients, students, oral care professionals and population in general.

The **specific learning outcome** for this competency is:

- Ability to communicate effectively to others in the field (students, dental care professionals and researchers) and to the general public

The **method of learning acquisition** involves:

- Attending seminars
- Presenting lectures
- Assisting in lectures/laboratories/clinics

The **assessment of the knowledge and acquired skills** is done by:

- Preparation of written material and oral presentations (thesis projects, manuscripts, papers, clinical case reports)
- Assessment of student learning
- Development of a rubric for their presentation

#### ***8. Evidence-based decision-making and ethical behavior competencies***

This competency is related to the understanding of the benefits of making clinical decisions based on the best scientific evidence available, at both the individual and public health levels, for the prevention and management of caries and other dental hard tissue disorders.

The **specific learning outcomes** for this competency are:

- Critical appraisal of scientific evidence as related to emerging trends, procedures and therapies that may impact oral health care
- The use of the best available evidence for clinical decision making
- Demonstration of ethical behavioral both professionally and personally

The **method of learning acquisition** involves:

- Attendance and active participation in classes, seminars and labs
- Clinical activities

The **assessment of the knowledge and acquired skills** is done by:

- Ability to successfully pass all required courses and qualifying examinations
- Direct assessment of student progress in the clinic

The graduate faculty of the Cariology and Operative Dentistry MSD program will review the progress of students at the end of each semester to determine if the Program is meeting its goals to prepare students in each of these areas. Changes that might be made include replacing faculty in certain courses, adopting new methods to present material, offering additional options for training, or engaging students in external training.

d. Assessment

**Clinical Assessment:** The student's performance in the clinic is evaluated based on clinical assessment standards stated on the Clinical Course syllabi, by the student advisory committee. Students also complete self-assessments of their performance.

**Written and Oral Examination:** The members of the student's advisory committee conduct oral and written examinations covering the candidate's field of study. The candidate must complete these examinations six months prior to the intended date of graduation. The student is eligible to take this examination upon completion of one-half of the didactic course work.

**Master's Thesis:** Scientific inquiry and research are required for a Master of Science in Dentistry (MSD) degree. Opportunities for both basic and clinical research are available together with appropriate support services and facilities. Degree candidates are required to carry out an original research project leading to the submission of an approved thesis. Preliminary review of the literature and selection of a research topic should be completed by the end of the first year of the program or sooner. Before starting research for the master's thesis, a research protocol approved by the student's research committee must be submitted to and approved by the IUSD Student Research Committee. Completion of the research and preparation of the thesis constitute an ongoing activity over the remainder of the program, culminating in the final Defense of Thesis examination. Students are required to submit their research papers to a peer-reviewed journal and work in close association with their mentors during the drafting and editing of the manuscript. MSD degrees are approved by Indiana University through a formal campus and university process, culminating in approval by the Board of Trustees of IU and finally the Indiana Commission for Higher Education (ICHE)

*Appendix 12: Learning Outcomes, Competencies and Assessments Table.*

e. Licensure and Certification

Graduates of this program will be prepared to earn the following:

- State License:

N/A

- National Professional Certifications (including the bodies issuing the certification):

N/A

- Third-Party Industry Certifications (including the bodies issuing the certification):

N/A

f. Placement of Graduates

The graduates of the MSD in Cariology and Operative Dentistry program are expected to work primarily as faculty members in dental schools. Employment opportunities also exist in healthcare-related areas in both the public (governmental) and private (business/industry). This master's program will also serve as a primary feeder for the PhD at IUSD or elsewhere.

g. Accreditation

- Accrediting body from which accreditation will be sought and the timetable for achieving accreditation.

N/A

- Reason for seeking accreditation.

N/A

**6. Projected Headcount and FTE Enrollments and Degrees Conferred**

The projected headcounts and FTE enrollments for the next five years are reflected in the table that follows. The program will not take more than five years to be fully implemented and reach a steady state. The table was created for the IUPUI campus, as this degree will not be offered at off-campus locations.

# NEW ACADEMIC DEGREE PROGRAM PROPOSAL SUMMARY

Jul, 2015

Institution/Location: Indiana University-Purdue University Indianapolis/Indianapolis  
 Program: Master's of Science Degree in Cariology and Operative Dentistry  
 Proposed CIP Code:  
 Base Budget Year: 2015-16

	Year 1 <u>2015-16</u>	Year 2 <u>2016-17</u>	Year 3 <u>2017-18</u>	Year 4 <u>2018-19</u>	Year 5 <u>2019-20</u>
Enrollment Projections (Headcount)					
Full-time Students*	4	8	12	12	12
Part-time Students	-	-	-	-	-
	4	8	12	12	12
Enrollment Projections (FTE)					
Full-time Students	4	8	10.75**	10.75	10.75
Part-time Students	-	-	-	-	-
	4	8	10.75	10.75	10.75
Degree Completion Projection	-	-	4	4	4
CHE Code:					
Campus Code:					
County Code:					
Degree Level:					
CIP Code:					

\* Students are considered full-time throughout all the three years of the program, according to the IUPUI Student Handbook, as they will have completed 30+ hours in courses and deferred thesis credits by the end of year 1; and will be enrolled in at least 1 hour of graduate thesis in each semester.

\*\* For years 1 and 2, each student will take 1 FTE (× 4 students = 4 FTE, in each of the years); for year 3 a total of 11 credits will be taken, which represents 0.6875 FTE, based on the 16 credit hours expected for a year (× 4 students = 2.75 FTE, for year 3). Therefore, 4 FTE (year 1) + 4 FTE (year 2) + 2.75 FTE (year 3) = 10.75 FTE.

## *Appendix 1: Institutional Rationale*

**IUPUI Mission and Values:** <http://www.iupui.edu/about/vision-mission.html>

### **IUSD Mission, Goals, Vision and Core Values:**

- **Mission, Goals and Vision:** <https://www.dentistry.iu.edu/index.php/about-us/mission-and-goals/>

- **IUSD Core Values:** <https://www.dentistry.iu.edu/index.php/about-us/core-values/>

### **IUSD Graduate Education:**

- **Vision Statement:** To develop and maintain nationally and internationally-recognized graduate programs, for the ultimate benefit of a healthy society.

- **Mission Statement:** To provide leadership and support to faculty at the Indiana University School of Dentistry in order to develop the highest quality graduate programs. To provide administrative support and resources to enable students and faculty to meet the scholarly requirements of these programs. To maintain a database of student and alumni records, assist programs with evolving curricular change, and represent IUSD at campus, national and international events.

### **IUSD MS/MSD in Preventive Dentistry Program Vision and Mission:**

- **Vision Statement:** The vision of the Master of Science and Master of Science in Dentistry (MS/MSD) Preventive Dentistry program (the Program) is to be nationally and internationally recognized as the best graduate program focusing on the primary prevention of dental caries and maintenance of oral health at the individual patient level.

- **Mission Statement:** The mission of the Program is to educate dental professionals to be knowledgeable educators, researchers and practitioners of primary caries prevention and management.

The **Vision and Mission** of the MS/MSD Program reflect the visions and missions of the Department of Preventive and Community Dentistry and the Indiana University School of Dentistry (IUSD); to advance the oral health and general overall health of the people of the State of Indiana and others worldwide through excellence in teaching and learning, research and creative activities. The Program seeks to fully incorporate and use the Principles of Graduate and Professional Learning as approved by the Indianapolis Faculty Council on April 5, 2011 as its conceptual educational framework.

### **- Goals:**

#### **Teaching and Learning**

- Attract dental professionals both nationally and internationally who are seeking to better understand the biology of dental caries.
- Enhance student learning and develop graduates who are highly competent clinicians, critical thinkers and lifelong learners who are ethical, socially responsible, and culturally sensitive professionals of oral health care.
- Provide the foundation for graduates to achieve proficiency as they advance in their career.



- Provide faculty and support to enhance effective learning in clinical, laboratory, classroom, and field settings.
- Prepare students to become future academicians.

#### Research and Creative Activities

- Provide opportunities for students to participate in high-quality, innovative research and scholarly activities, which engage the students and lead to improvements in oral and overall health
- Using their research as a basis, provide students opportunities to present their research to peers and future collaborators in their field of interest
- Prepare students to enter advanced research programs (PhD) and become future researchers.

The overall goal of the program is to provide opportunities for our students to advance from being competent practitioners in primary prevention to being proficient in primary prevention.

#### **IUSD MSD in Operative Dentistry Program Vision, Mission and Goals**

**- Vision Statement:** To develop Operative Dentistry “specialists” with enhanced restorative skills and understanding, who rely on critical thinking and clinical expertise to treat difficult restorative case, and have the ability to instruct other dentists and dental students in restorative materials and procedures.

**- Mission Statement:** To provide an evidence-based learning environment enabling graduate students to increase the depth and breadth of restorative dentistry knowledge. To provide clinical experiences that develop skills and judgment, moving the student from a level of competence to proficiency. To provide exposure to the scientific method through the completion of master-level research.

#### **- Goals:**

- To increase the depth and breadth of evidence-based knowledge and understanding of restorative dentistry concepts and procedures
- To enhance critical thinking and the ability to find answers to restorative questions
- To improve each student’s clinical restorative skills and judgment, moving them from a level of competence to a level of proficiency
- To expose students to the investigative process through the completion of a master-level research project and the writing and defense of a master’s thesis.
- To inspire students to continue the pursuit of dental knowledge
- To improve each student’s ability to organize restorative dentistry information and teach it to others.
- To inspire students to continue to strive to attain expertise and mastery when performing dental restorative procedures and to pursue excellence in all that they do

*Appendix 2: Summary of Indiana DWD and/or U.S. Department of Labor Data*



- US Bureau of Labor Statistics: <http://www.bls.gov/ooh/healthcare/dentists.htm>
- Indiana DWD: [http://www.hoosierdata.in.gov/docs/hwhd/hwhd2011\\_2013.pdf](http://www.hoosierdata.in.gov/docs/hwhd/hwhd2011_2013.pdf)

*Appendix 3: National, State, or Regional Studies*

- Indiana Strategic Oral Health Plan: [www.in.gov/isdh/files/IOHP\\_2012.pdf](http://www.in.gov/isdh/files/IOHP_2012.pdf)

## Appendix 4: Job Postings

### Chair of the Department Of Cariology and Operative Dentistry Indiana University School of Dentistry



Indiana University School of Dentistry invites applications for the position of Chair of the newly established Department of Cariology and Operative Dentistry. The department includes the disciplines of Operative Dentistry, Preventive Dentistry and Cariology. The successful candidate will have the title of the Indiana Dental Association Endowed Chair (of Restorative Dentistry).

The administrative expectations of the Chair include leadership of the department of faculty, staff, and students, programmatic oversight in both pre-doctoral and post-doctoral education, strategic recruitment of outstanding faculty, fiscal responsibilities and planning.

The successful candidate should have academic leadership experience, a national reputation in disciplinary excellence, documented success in leading strategic initiatives and demonstrate a strong record of scholarship and research.

The Endowed Chair responsibilities include collaboration with the Indiana Dental Association leadership, state-wide presentations in clinical dentistry and interact with and serve as a clinical resource for the Indiana dental community.

Qualified applicants should be eligible for tenure at the rank of full professor at Indiana University Purdue University Indianapolis. Minimum credentials include both a DDS or DMD from a CODA accredited program or equivalent with preferred credentials to include formal advanced education and credentials in preventive dentistry, operative dentistry, public health, or a related field. Candidates must be eligible for licensure in the State of Indiana. Rank and salary will be commensurate with the candidate's qualifications, experience and credentials.


Please send a complete electronic application with the following documents:

- Signed letter of intent.
- Complete curriculum vitae.
- Names of three professional references (letters will be required prior to an interview).
- For tenure, three additional professional references of persons who will be able to provide an objective assessment of the candidate's academic contributions and scholarship will be required (letters will be required prior to an interview).
- Documents should be sent to [dsaecef@iupui.edu](mailto:dsaecef@iupui.edu) with the subject line reference posting #IN-DENT 14002.

Review of applicants will begin immediately with an anticipated appointment start date of July 1, 2014. Indiana University is an equal employment opportunity/equal access/affirmative action employer and a provider of ADA services.

Indiana University School of Dentistry is located on the IUPUI campus near the heart of downtown Indianapolis. The School of Dentistry is the only dental school in the Hoosier state and educates 80% of the dentists practicing in Indiana and offers an extraordinary learning environment in which teaching, research and community service are uniquely combined to prepare tomorrow's dental professionals.

Indiana University School of Dentistry  
<http://www.dentistry.iu.edu/>





## Department of Cariology, Restorative Sciences and Endodontics

### CRSE Restorative Faculty Search

The University of Michigan invites applications and nominations for a full-time clinical or tenure track faculty member at the level of Assistant or Associate Professor in the Division of Restorative Dentistry. The School and Department are fully engaged in refining a new model for dental education that includes evidence-based dentistry and inter-professional education. At the same time, the Department is involved in a broad range of areas including educational research, cariology, tissue engineering, cancer biology, materials science, clinical research, and public health and policy research. The successful candidate for the clinical track should demonstrate sound preparation for teaching, potential for clinical scholarly activity, and clinical experience. Candidates for the clinical track should have a DDS/DMD degree and the ability to be licensed in Michigan. A MS degree in a field relevant to the position is desirable, but not necessary. For the tenure track, candidates who demonstrate a record of ongoing scholarly activity and strong potential for obtaining extramural research funding are encouraged to apply. Candidates for tenure track should have a DDS/DMD degree and/or PhD degree (or equivalent). The department has an active mentorship program for both clinical and tenure-track faculty and will provide ample opportunities for clinic-based patient care and development of collaborative research programs. Opportunities are available for participation in the School of Dentistry Faculty Practice. Salary and level of academic appointment will be commensurate with qualifications and experience.

A State of Michigan Clinically Limited Academic License may be available for qualified candidates. Applicants should submit curriculum vitae, statement of interests and goals, and the names of three references via the secure website: (<http://facultyrecruiting.dent.umich.edu>). Applications will be accepted and evaluated on an on-going basis until the position is filled. Further information may be obtained by consulting the departmental website at: <http://dent.umich.edu/about-school/department/crse/cariology-restorative-sciences-and-endodontics-crse>.

Questions for the search committee should be directed to Dr. Tilly Peters, Search Committee Chair, c/o Jean Klark; at [jklark@umich.edu](mailto:jklark@umich.edu)

The University of Michigan is an Affirmative Action\Non-Discriminatory employer.

Chair Position in Department of Cariology, Restorative  
Sciences, and Endodontics  
University of Michigan

Direct Link: <http://www.AcademicKeys.com/r?job=63225>

Downloaded On: Mar. 31, 2015 8:00am

**Job Title** Chair Position in Department of Cariology, Restorative Sciences, and Endodontics  
**Department** School of Dentistry  
**Institution** University of Michigan  
Ann Arbor, Michigan

**Date Posted** Jan. 2, 2015

**Application Deadline** Open until filled  
**Position Start Date** Available immediately

**Job Categories** Department Head/Head/Chair

**Academic Field(s)** Prosthodontics/Restorative Dentistry  
Endodontics  
Cariology

**Apply Online Here** <http://facultyrecruiting.dent.umich.edu>

**Job Description**

Chair Position in Department of Cariology, Restorative Sciences, and Endodontics

The University of Michigan School of Dentistry invites qualified applicants and nominations for the chair position in the Department of Cariology, Restorative Sciences and Endodontics

Applications and nominations are solicited for an outstanding opportunity as Professor and Chair of the Department of Cariology, Restorative Sciences, and Endodontics. This will be a full-time, tenured position to lead the largest of six academic departments in the School of Dentistry that comprises the fields of cariology, restorative sciences, and endodontics.

The Chair is the leader of the department and is responsible for promoting quality and interdisciplinary instruction and mentoring; fostering basic and clinical research productivity that positively impacts the School and beyond; and applying expertise in innovative ways that benefit collaborators from campus, the community and the discipline. The department plays an integral role in the delivery of comprehensive patient care, practice management and dental education at the predoctoral and graduate levels. Current research themes include clinical research, restorative dentistry, health services research and pulpal regenerative therapies. The Chair has the responsibility for creating and sustaining an environment of academic excellence while providing leadership for the overall administrative operations of the department. As the

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THE UNIVERSITY  
of NORTH CAROLINA  
at CHAPEL HILL

## OPEN POSITION

### Operative Dentistry Faculty Position

The University of North Carolina at Chapel Hill (UNC) School of Dentistry invites applications for two full-time tenured/tenure track or fixed-term open-rank faculty positions in the Department of Operative Dentistry. The department has a strong pre-doctoral curriculum, an outstanding graduate program in Operative Dentistry leading to a Master's degree, an Advanced Education in General Dentistry program, an active intramural faculty practice, and strong history of scholarship and funded extramural research. We are seeking dentists who are outstanding educators, clinicians, scientists and communicators and who will participate in didactic and clinical instruction at the predoctoral and graduate level as well as in research activity. The successful candidates will also be expected to mentor graduate students in their Master's degree research projects. A State of North Carolina limited academic dental license may be available for qualified candidates. Participation in an intramural faculty practice is expected. Rank and salary will be determined by the selected candidates' qualifications and experience.

Open until filled. Tentative start date: July 1, 2015.

Please submit a cover letter, a current curriculum vitae, a statement of current and future research interests (if applicable), and the names and complete contact information for three professional references.

Online Job Link: <http://unc.peopleadmin.com/postings/70399>



UNC  
SCHOOL OF DENTISTRY

**Educational Requirements:** A Doctor of Dental Surgery (DDS), Doctor of Dental Medicine (DMD) or equivalent degree, and a Master's degree in a relevant field and/or advanced education in Operative or General Dentistry are required.

**Qualifications and Experience:** Excellent oral and written communication skills, and a commitment to diversity, inclusivity and collegiality is required. A record of scholarly achievement (required for tenured/tenure track position), experience teaching and mentoring students, and demonstrated clinical excellence in Operative Dentistry is preferred.

**Department Contact Name and Title:**  
Lee Boushell, DMD, MS, Search Committee Chair  
919-537-3982, [boushell@dentistry.unc.edu](mailto:boushell@dentistry.unc.edu)

The University of North Carolina at Chapel Hill is an Equal Opportunity Employer. Women and minorities are encouraged to apply.

[Home \(/\)](#) > [Open Recruitments \(/apply\)](#) > Recruitment Details

## Full-Time Tenure-Track Faculty Position Section of Restorative Dentistry, Division of Constitutive and Regenerative Sciences

[Apply Now](#)

Job #JPF00725  
DENTISTRY - DENTISTRY

### RECRUITMENT PERIOD

Open Dec 15, 2014 through Mar 31, 2015

### DESCRIPTION

The UCLA School of Dentistry invites applications for a full-time, tenure-track faculty position at the level of assistant professor in the Section of Restorative Dentistry, Division of Constitutive and Regenerative Sciences, beginning July 1, 2015.

The selected individual will be responsible for clinical and didactic teaching in the Section of Restorative Dentistry, and will have the opportunity to participate in intramural clinical practice. The candidate will be expected to develop and maintain an extramurally funded research program.

The candidate must hold DDS or DMD degree (or equivalent) from a dental school accredited by the ADA Commission on Dental Accreditation (CODA) and must have California dental license or be eligible for dental license/special permit in California. Demonstration of commitment to innovative, scholarly research, teaching excellence, and outstanding patient care is highly desirable, as well as demonstration or likely commitment to diversity-related teaching/research/service. Applicants with a PhD or equivalent degree are preferred.

<https://recruit.apo.ucla.edu/apply/JPF00725>

3/31/2015



## Appendix 5: Letters of Support



Academy of Operative Dentistry



SCHOOL OF  
DENTISTRY  
UNIVERSITY OF MICHIGAN

E. Angeles Martinez-Mier, DDS, MSD, PhD  
Department Chair  
Cariology, Operative Dentistry and Dental Public Health  
Indiana University School of Dentistry  
415 Lansing Street  
Indianapolis, IN, 46202, USA

July 6, 2015

Dear Dr. Martinez-Mier,

With this letter I want to express my strong support for the proposed "MSD Program in Cariology and Operative Dentistry" to be offered by your department at the Indiana University School of Dentistry (IUSD). I believe that this program fits very well with a recent recommendation made by the American Dental Education Association (ADEA) for Academic Dental Institutions, where it supports and encourages education on dental caries prevention and management based on the best evidence available for proper diagnosis, risk assessment, and prognosis, associated to preventive oral health care measures, and minimally invasive nonsurgical and surgical procedures.

As current President of the Academy of Operative Dentistry (AOD), Past-President of the Cariology Group of the International Association for Dental Research (IADR), and Professor Emerita at the University of Michigan with extensive expertise in both Cariology and Restorative Dentistry, I am keenly aware of the tremendous need for a fresh approach addressing essential health care issues in both fields. The last two decades have seen a tremendous progress in our understanding of the dental caries process, prevention and management options. Currently available therapies and technological advances in adhesive restorative dentistry offer an excellent opportunity to make great strides in preventing caries disease and improving oral health care for future generations.

The proposed program will have a great impact by developing a strong backbone to the combined field. By developing a high-quality contemporary educational program for clinicians, educators and researchers, this effort will further the integrated teaching and research of Cariology, Restorative and Public Health Dentistry. Bringing these strongly related fields closer to one another in the offering of an integrated Master's program will provide a solid basis and further the oral health care agenda. Its future graduates and resulting workforce in the dental arena will impact and contribute to a rapid advance in necessary improvement of oral health care for all.

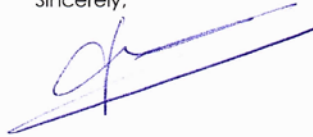
The planned program presents a common curriculum and research agenda that integrates clinical, research and community practices existing at IUSD that could not be otherwise achieved. This unique approach will identify this program as one of the leaders of its type in the United States; and help IUSD further develop its national and international reputation as a center for education and research in the areas of Cariology and Operative Dentistry. It is in great alignment with the current structural changes at IUSD, with the creation of the integrated Department of Cariology, Operative Dentistry and Dental Public Health.

The faculty members to be involved with this program are highly-qualified researchers, clinicians and educators, which certainly will contribute to the implementation and development of the new program. Many are actively involved in professional organizations as the AOD, ADEA, AADR/IADR and the European Organization for Caries Research (ORCA).

A program as proposed would not only impact the program-graduates' knowledge and expertise, rather it would impact many US dental schools in the future as these graduates will venture out as well-trained clinicians and academics, professionals with ample expertise in these fields. This workforce and the snowball effect their training may have on future dental school teachings and curriculum development in the US, will concurrently help in reducing existing oral health disparities. I anticipate this program to become a tremendous asset at IUSD and to represent a considerable step forward nationwide in future prevention and management of a preventable but still ubiquitous disease.

I am thrilled about the prospects of the proposed MSD Program in Cariology and Operative Dentistry. I whole-heartedly support this program and look forward to witnessing its success in the near future.

Sincerely,



**Mathilde C. Peters**, DMD, PhD, FADM, FICD

President – Academy of Operative Dentistry

*Professor Emerita*

Cariology, Restorative Sciences and Endodontics

University of Michigan,

Ann Arbor, MI, USA



Michael R. Pence  
Governor

Jerome M. Adams, MD, MPH  
State Health Commissioner

June 29, 2015

E. Angeles Martinez-Mier, DDS, MSD, PhD  
Department Chair, Cariology, Operative Dentistry and Dental Public Health  
Indiana University School of Dentistry  
415 Lansing Street  
Indianapolis, IN, 46202  
USA

Dear Dr. Martinez-Mier,

I am delighted to write a letter of support for the "MSD Program in Cariology and Operative Dentistry" proposed by the Indiana University School of Dentistry (IUSD). I have had the pleasure of working with you and your colleagues for the past five years, many of whom will likely participate in this new graduate program. Indiana is fortunate to have so many experienced and internationally recognized educators and researchers in these areas of dentistry.

Based on my experience as the State Oral Health Director in Indiana for over five years, and based on my more than 20 years experience as an epidemiologist conducting research on diseases and disorders of the oral and facial region, I can attest to the need for such a program in Indiana given the high burden of dental caries among certain populations within Indiana and beyond.

Because of the capabilities of the Indiana University School of Dentistry in the areas of cariology, operative dentistry, and dental public health, and its international reputation in these areas, this program will be immediately recognized as one of the premier programs in the world, which will allow it to attract the best and brightest to Indiana to take advantage of this opportunity to advance their training.

I strongly support the proposed MSD Program in Cariology and Operative Dentistry, as I am sure it will benefit the citizens of Indiana, the United States, and the international community.

Sincerely,

**JAMES R. MILLER, DDS, MSD, PHD**  
State Oral Health Director  
Oral Health Program, 2-F  
317.233.7427 office



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18 June 2015

From: CAPT Scott Kooistra, Department Chair, Operative Dentistry, Naval Postgraduate Dental School,  
Navy Medicine Professional Development Center, Bethesda, MD. Specialty Leader for  
Operative Dentistry to the Surgeon General of the Navy.

To: Whom It May Concern

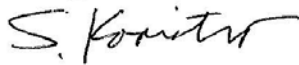
Subj: LETTER OF SUPPORT FOR MASTER'S PROGRAM IN CARIOLOGY AND OPERATIVE  
DENTISTRY AT INDIANA UNIVERSITY SCHOOL OF DENTISTRY

1. It is with great pleasure that I write this letter in support of the proposed new Master's Program in Cariology and Operative Dentistry at Indiana University's School of Dentistry. The Navy Dental Corps currently consists of roughly 1,100 dental officers, 25 of which are classified as "Operative & Preventive Dentistry Specialists." These 25 officers have completed residency training in Operative/Restorative Dentistry at one of four civilian dental schools, to include Indiana, Iowa, Michigan and North Carolina. In the Navy, Operative dentists are heavily relied upon to provide both didactic and clinical training to our roughly 500 general dentists, with the goal of making these generalists the best they can be in terms of current knowledge and clinical procedures. Operative dentists teach AEGD residents, GPR residents, 1st year officers just out of dental school and staff general dentists. In addition to the 1,100 active duty dental officers, the Navy also employs several hundred civilian dentists to provide general dental services. Operative dentists are the sole responsible agents for teaching and implementing the Navy's Caries Risk Management program. Dental caries among our young population is a major issue. Of the 525,000 active duty Navy and Marine Corps personnel that the Dental Corps supports, roughly 75% are considered either high or moderate caries risk. The unique military environment consisting of deployment upon ships or in remote theaters even compounds the problem in that many times our Sailors and Marines have poor diets, poor oral hygiene habits and limited access to dental care. For us, caries risk management is an absolute requirement to keep dental health at a level that can be managed with our current force structure. Thus, it is critical that our Operative dentists receive robust training in cariology, caries risk management and minimally-invasive treatment protocols.

2. The proposed new Master's program has a very substantial emphasis in cariology. The Navy regularly appoints an Operative dentist to serve as the Preventive Dentistry Specialty Leader to the Navy Surgeon General. This individual must possess a solid, contemporary understanding of the cutting-edge philosophies and practices for reducing caries risk among our military population. A program in Cariology and Operative Dentistry could serve as a seemingly perfect training opportunity to impart that knowledge to our dental officers who attend Indiana for residency training. Some of the other civilian residency programs in Operative dentistry have minimal training in cariology, which is regrettable in that the two areas are inextricably linked together. The Navy Dental Corps would be very supportive of this new Master's program in sending our officers to IUSD to receive this highly important training.

3. Please don't hesitate to contact me if I can be of further assistance.

Sincerely,



Scott Kooistra, DDS, MS, ABOD  
Chairman, Operative Dentistry Department  
Navy Medicine Professional Development Center (NMPDC)  
8955 Wood Road  
Bethesda, MD 20889-5628  
Tel: 301-319-4687  
E-mail: [scott.kooistra2.mil@mail.mil](mailto:scott.kooistra2.mil@mail.mil)



28<sup>th</sup> June, 2015

To whom it may concerns,

It is my great honor to write this supporting letter for the proposal of the new Master Program in Cariology and Operative Dentistry being submitted to Indiana University by the Cariology, Operative Dentistry and Dental Public Health Department at Indiana University School of Dentistry (IUSD).

I have had the privilege to be a graduate student in the Operative Dentistry Postgraduate Program at IUSD from 2008 and until 2010 and I am very proud to be one of the IUSD alumni. This program is considered one of the well-known and strong programs that offer a postgraduate certificate in operative dentistry. It is designed to offer courses mainly in operative dentistry and some introduction to preventive dentistry. The operative dentistry courses were aimed to teach students the theoretical and clinical procedures used to treat and manage dental caries surgically. The preventive dentistry courses, on the other hand, focus on teaching the pathology of dental caries and methods of its prevention. Since these two topics are interrelated and support each other, it is highly recommended to get training in both disciplines. However, when studying them separately, it can be difficult to determine how the information fits together to optimize patient treatment. In addition, as international students, it is often difficult to get sponsor approval to take a second course of study.

By combining the Cariology and Operative Dentistry, I believe that the ultimate goal of the program which is developing and enhancing the students' knowledge in caries prevention, diagnosis and oral health maintenance in addition to clinical treatment will be achieved. Especially here in Saudi Arabia where caries index is very high and all educational institutes and dental centers shift their efforts toward preventive and conservative operative treatment for dental caries. This combination will attract a lot of Saudi students to pursue their postgraduate study in this new program.

I fully support the efforts of the Cariology, Operative Dentistry and Dental Public Health Department in their new master program which will add a lot to the field of caries prevention and management. I think the graduates of this program will be highly qualified educators and dentists who can spread their knowledge and expertise to improve the dental health status throughout the community.

***Dr. Abdullah Al-Jamhan, BDS, MSD, ABOD***

Assistant Professor, Restorative Dental Sciences Department,  
College of Dentistry, King Saud University  
Riyadh, Saudi Arabia  
Email: [a.aljamhan@ksu.edu.sa](mailto:a.aljamhan@ksu.edu.sa)



S. Martignon, DDS, Certificate in Pediatric Dentistry and in Teaching, PhD

Professor

UNICA Caries Research Unit Chair - Master in Dental Sciences Chair  
Universidad El Bosque  
Av Cra 9 No 131A - 02  
Bogota, 110121  
Colombia

Senior Lecturer

Dental Innovation and Translation Centre (DITC)  
King's College London  
London  
UK

Bogota, June 28, 2015

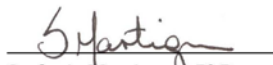
Dear Dr. Martinez-Mier,

It is with great pleasure that I write to support the "MSD Program in Cariology and Operative Dentistry" being proposed by the Indiana University School of Dentistry (IUSD). I have worked in the area of Cariology for nineteen years, and specifically building and chairing a Caries Research Unit (UNICA) at Universidad El Bosque in 2002 and directing since 2012 the Master in Dental Sciences at the same school. In addition, I work part-time in King's College London since last year (Dental Innovation and Translation Center). I believe that your proposed program is necessary because there is a gap in the translation of the current caries paradigm into the profession, education, practice and epidemiology, including the preservation tooth care. Education on dental caries based on the best evidence available for proper diagnosis, risk assessment, and prognosis, associated to preventive oral health care measures, and minimally invasive nonsurgical and surgical procedures is of very high relevance for achieving the changes the related academia has been seeking in this field.

After reviewing the program materials, it is clear that the proposed program will have a curriculum and research agenda that will push these goals forward in a short-, medium- and long-term time period. A program like yours is responding to the current state of the science in dental education because there is a lack of translation into practice of current evidence and a need to spread this knowledge right from the university for new cohorts of dentists with a more scientific background to manage caries. The faculty members to be involved with this program are remarkably expert in these areas with a well-established research laboratory backing up new arriving evidence since more than three decades; their teaching experience reach that level as well. These strengths will make your program unique, with the combination of the basics and walking through the whole path to the required operative treatment, and the related staff is known for their strengths in these fields.

I strongly support the proposed MSD Program in Cariology and Operative Dentistry, and look forward to its future success.

Sincerely,



Stefania Martignon, PhD  
Universidad El Bosque  
King's College London

### *Appendix 6: Faculty and Staff*

The following faculty members have agreed to serve as faculty in the proposed MSD program in Cariology and Operative Dentistry:

Name	Department	Areas of Expertise	Academic Degree(s)	%FTE for MSD program
<b>FULL-TIME FACULTY (as of 2/18/2015)</b>				
Masatoshi Ando	Preventive and Community	Cariology, Operative Dentistry	D.D.S., Ph.D.	15-20%
Oriana Capin	Operative Dentistry	Cariology, Operative Dentistry	D.D.S.	30-40%
Norman B. Cook	Operative Dentistry	Cariology, Operative Dentistry	D.D.S., M.S.D.	50-60%
Kim E. Diefenderfer	Operative Dentistry	Cariology, Operative Dentistry, Dental Public Health	D.M.D., M.S., M.S.	30-40%
Ana G. Gossweiler	Preventive and Community	Cariology, Operative Dentistry, Periodontology	D.D.S., M.S.D.	5-10%
Anderson T. Hara	Preventive and Community	Cariology, Operative Dentistry	D.D.S., M.S.D., Ph.D.	20-30%
Richard D. Jackson	Preventive and Community	Cariology, Pediatric Dentistry	D.M.D.	5-10%
Frank Lippert	Preventive and Community	Cariology	M.Sc., Ph.D.	15-20%
Angeles Martinez-Mier	Preventive and Community	Cariology, Operative Dentistry, Periodontology	D.D.S., M.S.D., Ph.D.	5-10%
Gerardo Maupomé	Preventive and Community	Cariology, Operative Dentistry, Public Health	B.D.S., M.Sc, D.D.P.H. R.C.S.(E), Ph.D	5-10%
Armando Soto-Rojas	Preventive and Community	Cariology, Operative Dentistry, Public Health	D.D.S., M.S.H.	5-10%
Domenick T. Zero	Preventive and Community	Cariology, Operative Dentistry	D.D.S., M.S.D.	5-10%

## *Appendix 7: Facilities*

N/A



*Appendix 8: Other Capital Costs*

N/A

*Appendix 9: Articulation of Associate/Baccalaureate Programs*

N/A

### Appendix 10: Credit Hours Required/Time To Completion

A typical three-year sequence is given in tabular form in the following Table.

**Required Courses** for completion of the 3-year Operative Dentistry & Cariology MSD program.

Year 1	Course	Title	Credits
Summer	G948	Advanced Radiographic Imaging (Summer)	2
	R955	Oral Biology (Summer)	2.5
Fall	G907	Clinical Oral Pathology Conference I (Fall)	1
	R909	Advanced Preventive Dentistry I (Fall)	3
		Introduction to Research (being developed)	1
	G912	Properties & Test Methods: Dental Materials (Fall) PR	2
	G952	Analysis of Operative Procedures with Lab(Fall)	3
	G953	Recent Advances in Operative Dentistry w/ Lab(Fall)	3
	G910	Operative Dentistry/Cariology Seminar	1
Spring	G909	Clinical Oral Pathology Conference II	1
	R910	Advanced Preventive Dentistry II (Spring)	3
	G911	Dental Materials Science and Engineering (Spring)	2
	G913	Clinical Application of Dental Materials (Spring)	2
	G950	Advanced Clinical Operative Dentistry	2
	G951	Interdisciplinary Role of Operative Dentistry (Spring)	2
	G910	Operative Dentistry Seminar (Presentation Course)	1
	G910	Operative Dentistry/Cariology Seminar	1
		Esthetic Dental Procedures with lab (NEW)	2
		<b>First Year Credit Hours Subtotal</b>	<b>34.5</b>
Year 2			
Summer	G930/G925	Research (thesis)	1
	G950	Advanced Clinical Operative Dentistry	2
Fall	R911	Advanced Preventive Dentistry III (Fall)	2
	G660	Clinical Research Methods	3
	G910	Introduction to Bio-Statistics (Fall)	3
	G950	Advanced Clinical Operative Dentistry	2
	G910	Operative Dentistry/Cariology Seminar	1
Spring	G959	Oral Microbiology	3
	G950	Advanced Clinical Operative Dentistry	2
	G910	Operative Dentistry/Cariology Seminar	1
		<b>Second Year Credit Hours Subtotal</b>	<b>19</b>
Year 3			
Summer	G930/G925	Research (thesis)	1
	G950	Advanced Clinical Operative Dentistry	1
Fall	G930/G925	Research (thesis)	2
	G950	Advanced Clinical Operative Dentistry	1
	G910	Operative Dentistry/Cariology Seminar	1

Spring	G930/G925	Research (thesis)	3
	G950	Advanced Clinical Operative Dentistry	1
	G910	Operative Dentistry/Cariology Seminar	1
		<b>Third Year Credit Hours Subtotal</b>	<b>11</b>
<b>Total credits</b>			<b>64.5</b>

*Names of courses may need to be changed, to reflect integration between Cariology/Preventive and Operative.*

Elective Courses:

Year 1			
Fall	R941	Fundamentals of Implant Dentistry I (Fall)	1
	R963	Dental Implantology	1
Spring	R963	Dental Implantology	1
Year 2			
Fall	R963	Dental Implantology	1
Spring	R963	Dental Implantology	1

*Appendix 11: Exceeding the Standard Expectation of Credit Hours*

N/A

Appendix 12: Learning Outcomes, Competencies and Assessments Table.

IUPUI GRADUATE LEARNING OUTCOMES	PROGRAM LEARNING OUTCOMES	COURSES LEARNING OUTCOMES	CLASSES LEARNING OUTCOMES	HOW COMPETENCY IS DEMONSTRATED	WHERE L.O. IS TAUGHT	HOW L.O. IS TAUGHT	HOW L.O. IS ASSESSED
<b>1. Demonstrates mastery of the knowledge and skills expected for the degree and for professionalism and success in Cariology and Operative Dentistry</b>	<b>A. Demonstrates competency in the Cariology knowledge base</b>	<ul style="list-style-type: none"> <li>Defines terms, explains and appraises principles, concepts, and theories related to the development, diagnostic, prevention and treatment of dental caries and other dental hard-tissue disorders</li> </ul>	<ul style="list-style-type: none"> <li>Describes the etiological factors involved in the dental caries and other dental hard-tissue disorders development</li> <li>Differentiates primary /secondary or /recurrent caries</li> <li>Differentiates coronal/root caries</li> <li>Differentiates incipient/non-cavitated or early lesion/cavitated or extensive lesion</li> <li>Differentiates active/ non-active lesion</li> </ul>	<ul style="list-style-type: none"> <li>Describes the caries process in detail</li> <li>Describes the dental hard-tissue disorders processes in detail</li> <li>Identifies the role of saliva in dental caries</li> <li>Interprets findings from different methods (x-rays, saliva tests, microbiological tests, etc) based on understanding of the disease</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>R910</li> <li>G959</li> <li>G910</li> <li>R955</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Hands-on lab and clinical activities</li> <li>Seminars</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written reports</li> <li>Evaluation of clinical performance</li> </ul>
	<b>B. Demonstrates competency in caries (and other dental hard-tissue disorders) risk assessment, diagnosis and management</b>	<ul style="list-style-type: none"> <li>Recognizes the epidemiology of dental caries (and other dental hard tissue disorders) at the population level and discriminate high risk groups</li> </ul>	<ul style="list-style-type: none"> <li>Describes epidemiology on: children, adolescents, adults, elderly</li> <li>Describes epidemiology data globally</li> <li>Describe epidemiology of on medically compromised patients</li> <li>Describe epidemiology on racial and ethnic/economically disadvantaged populations</li> </ul>	<ul style="list-style-type: none"> <li>Assesses risk of individual patients</li> <li>Identifies risk based on epidemiological findings</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>G910</li> <li>G909</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written reports</li> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Differentiates dental caries (and other dental hard tissue lesions) at the individual level applying traditional and technology-based methodologies</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates the importance and application of detection methods, including conventional and technology-based methods</li> <li>Performs caries detection using ICDAS</li> </ul>	<ul style="list-style-type: none"> <li>Detects caries using different traditional and cutting-edge methodologies</li> <li>Performs differential diagnosis of lesions on dental hard tissues</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>G910</li> <li>G948</li> <li>R955</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Practical Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written reports</li> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Analyses and appraises the risk factors of dental caries (and other dental hard tissue lesions)</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates the importance of the following risk indicators on lesion development: past disease experience, microbiological factors, host factors, dental anatomy, saliva, behavior, systemic health issues, socio-economic status, oral hygiene/plaque control, diet, fluoride exposure</li> </ul>	<ul style="list-style-type: none"> <li>Detects lesions</li> <li>Performs mutans and lactobacilli counts</li> <li>Assesses salivary flow measurements and buffering capacity and management approaches for patient with low salivary flow</li> <li>Describes and explains basic principles of human behavior and motivation to change</li> <li>Uses a plaque index</li> <li>Uses different methodologies for collection of diet diary</li> </ul>	<ul style="list-style-type: none"> <li>G959</li> <li>R909</li> <li>R910</li> <li>G909</li> <li>R955</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written Reports</li> <li>Evaluation of clinical performance</li> </ul>

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				<ul style="list-style-type: none"> <li>Performs a past fluoride exposure history</li> </ul>			
		<ul style="list-style-type: none"> <li>Assessment of caries (and other dental hard tissue lesions) risk status based on the risk indicators</li> </ul>	<ul style="list-style-type: none"> <li>Explains how different factors are used for risk assessment</li> </ul>	<ul style="list-style-type: none"> <li>Performs risk assessment on patients</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>R910</li> <li>G909</li> <li>G910</li> <li>R955</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written Reports</li> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Differentiates dental caries from other dental conditions, including dental wear and fluorosis</li> </ul>	<ul style="list-style-type: none"> <li>Contrasts the development processes of dental fluorosis and tooth wear with caries</li> <li>Explains the differences between the different dental wear mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>Performs differential diagnosis</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written Reports</li> <li>Evaluation of clinical performance</li> </ul>
	<b>C. Demonstrates competency in Preventive (non-surgical) therapy</b>	<ul style="list-style-type: none"> <li>Constructs, implements and assesses plan for caries and other dental hard-tissue disorders management</li> </ul>	<ul style="list-style-type: none"> <li>Explains the importance of risk factors and preventive and therapeutic measures for prevention at the patient and public health levels</li> <li>Summarizes the basic principles on developing patient education plans</li> </ul>	<ul style="list-style-type: none"> <li>Develops a management plan for control at individual level</li> <li>Develops a management plan for control at community level</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>R910</li> <li>G909</li> <li>G910</li> <li>R955</li> <li>G950</li> <li>Seal Indiana rotation</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written Reports</li> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Discriminates the preventive/therapeutic agents available for use in caries and other dental hard-tissue disorders management</li> </ul>	<ul style="list-style-type: none"> <li>Explains the importance and application of fluoride products (OTC, prescription and professionally applied, supplements), community fluoridation programs, non-fluoride agents</li> </ul>	<ul style="list-style-type: none"> <li>Able to write prescription for therapeutic agents</li> <li>Able to design a community plan for prevention and management</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>R910</li> <li>G909</li> <li>G910</li> <li>R955</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written Reports</li> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Compares and contrasts the use of systemic versus topical fluoride</li> </ul>	<ul style="list-style-type: none"> <li>Comprehends fluoride metabolism and applies information to determine toxicity</li> </ul>	<ul style="list-style-type: none"> <li>Calculates toxic level doses and creates a treatment plan</li> </ul>	<ul style="list-style-type: none"> <li>R910</li> <li>R911</li> <li>R955</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Hands on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> <li>Written Reports</li> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Comprehends the role of artificial sweeteners on caries management</li> </ul>	<ul style="list-style-type: none"> <li>Compares evidence of the use of xylitol</li> </ul>	<ul style="list-style-type: none"> <li>Incorporates the use of Xylitol in management plan as appropriate</li> </ul>	<ul style="list-style-type: none"> <li>R910</li> <li>G909</li> <li>G910</li> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Oral Exams</li> <li>Written Exams</li> <li>Presentations</li> </ul>

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							<ul style="list-style-type: none"> <li>▪ Written Reports</li> <li>▪ Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>• Discriminates the role of oral hygiene control on caries and other dental hard-tissue disorders management</li> </ul>	<ul style="list-style-type: none"> <li>• Describes chemical and mechanical techniques for plaque control</li> </ul>	<ul style="list-style-type: none"> <li>• Calculates Oral Hygiene Index using indexes</li> </ul>	<ul style="list-style-type: none"> <li>▪ R910</li> <li>▪ G950</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Seminars</li> <li>▪ Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Oral Exams</li> <li>▪ Written Exams</li> <li>▪ Presentations</li> <li>▪ Written Reports</li> <li>▪ Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>• Infers the role of oral health counseling and motivation plan</li> </ul>	<ul style="list-style-type: none"> <li>• Compares and contrast some of the different behavioral strategies</li> </ul>	<ul style="list-style-type: none"> <li>• Uses behavior counseling in management plan</li> </ul>	<ul style="list-style-type: none"> <li>▪ R909</li> <li>▪ R910</li> <li>▪ G909</li> <li>▪ G910</li> <li>▪ G950</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Seminars</li> <li>▪ Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Oral Exams</li> <li>▪ Written Exams</li> <li>▪ Presentations</li> <li>▪ Written Reports</li> <li>▪ Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>• Evaluates current evidence regarding effectiveness and use of dental sealants</li> </ul>	<ul style="list-style-type: none"> <li>• Contrasts caries prevention vs. caries management, at individual versus population levels</li> </ul>	<ul style="list-style-type: none"> <li>• Indicates and evaluates the placement and of sealants</li> </ul>	<ul style="list-style-type: none"> <li>▪ R910</li> <li>▪ G910</li> <li>▪ G950</li> <li>▪ Seal Indiana rotation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Seminars</li> <li>▪ Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Oral Exams</li> <li>▪ Written Exams</li> <li>▪ Presentations</li> <li>▪ Written Reports</li> <li>▪ Evaluation of clinical performance</li> </ul>
	<b><i>D. Demonstrates competency in Restorative (surgical) therapy</i></b>	<ul style="list-style-type: none"> <li>• Decides when the surgical intervention is appropriate for dental caries, understanding the consequences and prognosis of such decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Assesses the needs of patients and develops management plan</li> </ul>	<ul style="list-style-type: none"> <li>• Creates the treatment plan at individual (patient) level</li> </ul>	<ul style="list-style-type: none"> <li>▪ G910</li> <li>▪ G950</li> <li>▪ G951</li> <li>▪ G952</li> <li>▪ G953</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Seminars</li> <li>▪ Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Oral Examination (case presentation)</li> <li>▪ Self-assessment</li> <li>▪ Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>• Performs appropriate surgical treatment, focusing on preservation of sound tooth structure</li> <li>• Restores the form, function and esthetics of dental hard tissue, while promoting oral health</li> </ul>	<ul style="list-style-type: none"> <li>• Performs isolation for routine and complex restorative procedures</li> <li>• Performs pin and pinless retention</li> <li>• Performs routine and complex amalgam restorations</li> <li>• Performs glass ionomer restorations</li> <li>• Performs anterior and posterior resin restorations</li> </ul>	<ul style="list-style-type: none"> <li>• Implements the treatment plan at individual (patient) level</li> </ul>	<ul style="list-style-type: none"> <li>▪ G910</li> <li>▪ G950</li> <li>▪ G951</li> <li>▪ G952</li> <li>▪ G953</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Seminars</li> <li>▪ Hands-on lab and clinical activity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Oral Examination (case presentation)</li> <li>▪ Self-assessment</li> <li>▪ Evaluation of clinical performance</li> </ul>



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		<ul style="list-style-type: none"> <li>Understands dental materials science and their implications on the clinical indication and use of restorative materials</li> </ul>	<ul style="list-style-type: none"> <li>Describes current direct and indirect dental restorative materials (gold, dental amalgam, ceramics, glass ionomer cement and resin-matrix composite) including associated setting reactions, physical properties, and indications and contraindications for their clinical use</li> <li>Describes the treatment plan operative dentistry cases based on the clinical demands of the case and a working knowledge of the available treatment options</li> <li>Discusses how inclusion of other dental specialties in the treatment planning process can enhance restorative outcomes</li> <li>Discuss in detail, routine and advanced clinical operative restorative techniques and procedures</li> </ul>	<ul style="list-style-type: none"> <li>Provides treatment plans based on scientific evidence</li> </ul>	<ul style="list-style-type: none"> <li>G910</li> <li>G911</li> <li>G912</li> <li>G913</li> <li>G950</li> <li>G951</li> <li>G952</li> <li>G953</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Written exams</li> <li>Oral Exams</li> <li>Self assessment</li> <li>Evaluation of clinical performance</li> </ul>
	<b><i>E. Demonstrates competency in Advanced Restorative Techniques</i></b>	<ul style="list-style-type: none"> <li>Assesses patient treatment needs and formulates treatment plan</li> </ul>	<ul style="list-style-type: none"> <li>Performs necessary examination and diagnostic tests to identify treatment needs and formulates treatment plan.</li> </ul>	<ul style="list-style-type: none"> <li>Creates evidence-based treatment plan that meets the needs of the patient</li> </ul>	<ul style="list-style-type: none"> <li>G910</li> <li>G950</li> <li>G951</li> <li>G952</li> <li>G953</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Written exams</li> <li>Oral exams</li> <li>Self assessment</li> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Performs appropriate restorative treatment focusing on preservation of sound tooth structure</li> <li>Restoration of form, function and esthetics of dental hard tissues while promoting oral health</li> </ul>	<ul style="list-style-type: none"> <li>Performs isolation for complex restorative procedures</li> <li>Performs pin and pinless retention</li> <li>Performs complex amalgam restorations</li> <li>Performs glass ionomer restorations</li> <li>Performs anterior and posterior resin restorations</li> <li>Performs esthetic bonding</li> <li>Places endodontic posts</li> <li>Creates crown substructures</li> <li>Performs tooth preparation for and placement of cast gold, porcelain/metal, and all-ceramic restorations including porcelain veneers</li> <li>Restores single-tooth implants</li> <li>Performs digital impressions, and CAD/CAM milling of ceramic restorations</li> </ul>	<ul style="list-style-type: none"> <li>Implements treatment plan</li> </ul>	<ul style="list-style-type: none"> <li>G910</li> <li>G950</li> <li>G951</li> <li>G952</li> <li>G953</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hand-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Written exams</li> <li>Oral exams</li> <li>Self assessment</li> <li>Evaluation of clinical performance</li> </ul>

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		<ul style="list-style-type: none"> <li>Demonstrates advanced understanding of dental materials science and clinical indications and use of current restorative materials and treatment modalities.</li> </ul>	<ul style="list-style-type: none"> <li>Describes current direct and indirect dental restorative materials (gold, dental amalgam, ceramics, glass ionomer cement and resin-matrix composite) including associated setting reactions, physical properties, and indications and contraindications for their clinical use</li> <li>Describes the treatment plan operative dentistry cases based on the clinical demands of the case and a working knowledge of the available treatment options</li> <li>Discusses how inclusion of other dental specialties in the treatment planning process can enhance restorative outcomes</li> <li>Discusses in detail, routine and advanced clinical operative restorative techniques</li> <li>Demonstrates knowledge of the structure, properties, and processing of all dental materials</li> <li>Demonstrates knowledge on the testing methodology for the evaluation of materials employed in dentistry</li> <li>Identifies appropriate applications for various dental materials</li> <li>Discerns the validity of the evidence for various dental materials' applications</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Explains the clinical behavior of dental materials based on in-depth understanding of their physical properties</li> <li>Provides treatment plans based on scientific evidence</li> <li>Displays sound critical thinking and clinical judgment</li> <li>Demonstrates proper manipulation and placement of dental materials</li> </ul>	<ul style="list-style-type: none"> <li>G910</li> <li>G911</li> <li>G912</li> <li>G913</li> <li>G950</li> <li>G951</li> <li>G952</li> <li>G953</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Written exams</li> <li>Oral exams</li> <li>Oral presentations</li> <li>Written reports</li> <li>Evaluation of decision-making and clinical judgment during clinical procedures</li> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Demonstrates enhanced clinical expertise and critical thinking enabling the treatment of complex restorative cases</li> </ul>	<ul style="list-style-type: none"> <li>Independently treats complex clinical restorative cases achieving excellent treatment outcomes</li> </ul>	<ul style="list-style-type: none"> <li>Treats complex clinical restorative cases with minimal faculty guidance or intervention while achieving excellent treatment outcomes</li> </ul>	<ul style="list-style-type: none"> <li>G950</li> </ul>	<ul style="list-style-type: none"> <li>Clinical patient care</li> </ul>	<ul style="list-style-type: none"> <li>Evaluation of clinical performance</li> </ul>
		<ul style="list-style-type: none"> <li>Integrates knowledge with other clinical disciplines, such as Periodontology, Prosthodontics, Endodontics and Orthodontics</li> </ul>	<ul style="list-style-type: none"> <li>Understands how other dental disciplines can facilitate restorative treatment</li> <li>Understands the periodontal and endodontic principles associated with tooth restoration</li> <li>Understands how periodontal procedures can enhance esthetic treatment</li> <li>Describes the restorative procedures</li> </ul>	<ul style="list-style-type: none"> <li>Considers dental specialties when developing treatment restorative treatment plan</li> <li>Recognizes and diagnoses endodontic and periodontal problems. Seeks consultation and makes referral when indicated</li> <li>Protects periodontal tissues and dental pulp during restorative</li> </ul>	<ul style="list-style-type: none"> <li>G950</li> <li>G951</li> <li>G941</li> <li>R963</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on lab and clinical activities</li> </ul>	<ul style="list-style-type: none"> <li>Written exam</li> <li>Oral exam</li> <li>Evaluation of clinical performance</li> </ul>

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			involved for dental implants	<ul style="list-style-type: none"> <li>procedures</li> <li>Seeks consultation with other specialties when needed to enhance restorative treatment outcomes</li> <li>Restores dental implants</li> </ul>			
	<b><i>F. Demonstrates competency in Cariology and Operative Dentistry research</i></b>	<ul style="list-style-type: none"> <li>Comprehends different methodologies and techniques related to research in caries, other dental hard tissue disorders and dental materials</li> </ul>	<ul style="list-style-type: none"> <li>Applies important concepts in health services and outcomes research, including practice guidelines and quality improvement, and other special topics</li> <li>Discusses ethical aspects related to the scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>Critically evaluates scientific literature</li> <li>Design a study</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> <li>G660</li> <li>R955</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Exams</li> <li>Written Reports</li> <li>Presentations</li> </ul>
			<ul style="list-style-type: none"> <li>Prepares dental specimens and indicate their use in different areas of dental research</li> </ul>	<ul style="list-style-type: none"> <li>Make specimens for a research project</li> <li>Critically evaluates scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Reports</li> <li>Thesis</li> </ul>
			<ul style="list-style-type: none"> <li>Compares and contrasts the different experimental models used in caries and dental wear research</li> </ul>	<ul style="list-style-type: none"> <li>Conducts a study with a selected methodology</li> <li>Evaluates study results</li> <li>Critically evaluates scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Reports</li> <li>Thesis</li> </ul>
			<ul style="list-style-type: none"> <li>Comprehends fluoride metabolism, toxicity and methods used for their evaluations</li> </ul>	<ul style="list-style-type: none"> <li>Evaluates scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Reports</li> <li>Presentations</li> </ul>
			<ul style="list-style-type: none"> <li>Compares and contrasts the different existing methodologies for the measurement of mineral changes in tooth structure</li> </ul>	<ul style="list-style-type: none"> <li>Conducts a study with a selected methodology</li> <li>Evaluates study results</li> <li>Critically evaluates scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Reports</li> <li>Presentations</li> </ul>
			<ul style="list-style-type: none"> <li>Compares and contrasts the different existing methodologies for the measurement of tooth wear processes</li> </ul>	<ul style="list-style-type: none"> <li>Conducts a study with a selected methodology</li> <li>Evaluates study results</li> <li>Critically evaluates scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Reports</li> <li>Presentations</li> </ul>
			<ul style="list-style-type: none"> <li>Compares and contrasts the different methodologies used to measure salivary antibody levels</li> </ul>	<ul style="list-style-type: none"> <li>Conducts a study with a selected methodology</li> <li>Evaluates study results</li> <li>Critically evaluates scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> <li>R910</li> <li>G959</li> <li>R955</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Reports</li> <li>Presentations</li> </ul>
			<ul style="list-style-type: none"> <li>Compares and contrasts the different methodologies used to evaluate dental materials</li> </ul>	<ul style="list-style-type: none"> <li>Conducts a study with a selected methodology</li> <li>Evaluates study results</li> <li>Critically evaluates scientific literature</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Reports</li> <li>Presentations</li> </ul>
		<ul style="list-style-type: none"> <li>Develops and evaluates research hypotheses aimed at</li> </ul>	<ul style="list-style-type: none"> <li>Formulates a research hypotheses</li> <li>Develops a research protocol to test the hypotheses</li> </ul>	<ul style="list-style-type: none"> <li>Formulates a research hypothesis, develops a protocol and performs a study</li> </ul>	<ul style="list-style-type: none"> <li>R911</li> <li>G910</li> <li>G660</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on</li> </ul>	<ul style="list-style-type: none"> <li>Thesis Defense</li> </ul>

IUPUI GRADUATE LEARNING OUTCOMES	PROGRAM LEARNING OUTCOMES	COURSES LEARNING OUTCOMES	CLASSES LEARNING OUTCOMES	HOW COMPETENCY IS DEMONSTRATED	WHERE L.O. IS TAUGHT	HOW L.O. IS TAUGHT	HOW L.O. IS ASSESSED
		further advancing the field; publishes the research data		<ul style="list-style-type: none"> <li>Writes and defends a thesis</li> <li>Writes and submits a manuscript for publication</li> </ul>	<ul style="list-style-type: none"> <li>G651</li> </ul>	activities	
<b>2. Communicates effectively to others in the field and to the general public</b>	<b>G. Demonstrates competency teaching and educating in Cariology and Operative Science topics</b>	<ul style="list-style-type: none"> <li>Communicates effectively to others in the field (students, dental care professionals and researchers) and to the general public</li> </ul>		<ul style="list-style-type: none"> <li>Thesis, papers</li> <li>Oral presentations</li> <li>Assesses student learning</li> <li>Develops a rubric for their presentation</li> </ul>	<ul style="list-style-type: none"> <li>G910</li> <li>R909</li> <li>R910</li> </ul>	<ul style="list-style-type: none"> <li>Active Learning</li> </ul>	<ul style="list-style-type: none"> <li>Presentations</li> <li>Thesis</li> <li>Written reports</li> <li>Discussions</li> </ul>
<b>3. Thinks critically and applies good judgment in professional and personal situations</b>	<b>H. Demonstrates competency in evidence-based and ethical behavior in aspects related to Cariology and Operative Dentistry</b>	<ul style="list-style-type: none"> <li>Critically appraises scientific evidence as related to emerging trends, procedures and therapies that may impact oral health care</li> </ul>	<ul style="list-style-type: none"> <li>Applies critical thinking and problem solving skills in the planning for comprehensive care for individual patients and communities</li> <li>Applies critical thinking and problem solving skills in the planning for and conduct of research</li> <li>Understands the statistical methodologies used in the research literature</li> <li>Applies the appropriate statistical methodologies to test research hypotheses</li> </ul>	<ul style="list-style-type: none"> <li>Develops a management plan at individual level</li> <li>Develops a management plan at community level.</li> <li>Analyses of the scientific literature in preparation of oral presentations conducted in seminar</li> <li>Develops research hypotheses and methodologies</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>R910</li> <li>G910</li> <li>G651</li> <li>G930</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> <li>Hands-on activities</li> </ul>	<ul style="list-style-type: none"> <li>Written Reports</li> <li>Presentations</li> <li>Thesis</li> </ul>
		<ul style="list-style-type: none"> <li>Uses the best available evidence for clinical decision making</li> </ul>	<ul style="list-style-type: none"> <li>Uses evidence based knowledge when planning care for comprehensive individual patients and communities</li> <li>Uses evidence based knowledge</li> </ul>	<ul style="list-style-type: none"> <li>Thesis, papers</li> <li>Oral presentations</li> <li>Assesses student learning</li> <li>Develops a rubric for their presentation</li> </ul>	<ul style="list-style-type: none"> <li>R909</li> <li>R910</li> <li>R911</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>Seminars</li> </ul>	<ul style="list-style-type: none"> <li>Presentations</li> <li>Written reports</li> </ul>
		<ul style="list-style-type: none"> <li>Demonstrates ethical behavioral both professionally and personally</li> </ul>	<ul style="list-style-type: none"> <li>Reviews the following: research ethics (CITI test), protection of human subjects (HIPPA), IUSD Code of Ethics, knowledge of moral reasoning, knowledge and application of the Belmont Report</li> <li>Understands the function and responsibilities of the IRB</li> <li>Understands authorship, COI and scholarly integrity</li> </ul>	<ul style="list-style-type: none"> <li>Performs and passes tests for regulatory requirements</li> </ul>	<ul style="list-style-type: none"> <li>R955</li> <li>G660</li> </ul>	<ul style="list-style-type: none"> <li>Self paced learning</li> <li>Lecture</li> </ul>	<ul style="list-style-type: none"> <li>Objective Examinations</li> </ul>