

PROMOTION RECOMMENDATION
The University of Michigan
School of Dentistry

Marco Bottino, associate professor of dentistry, with tenure, School of Dentistry, is recommended for promotion to professor of dentistry, with tenure, School of Dentistry.

Academic Degrees:

Ph.D.	2010	The University of Alabama at Birmingham, Materials Sciences, Birmingham, Alabama, United States
M.S.	2005	University of São Paulo, Nuclear Technology, São Paulo, Brazil
D.D.S.	2001	Paulista University, Dentistry, São Paulo, Brazil

Professional Record:

2017-present	Associate Professor, with tenure, Cariology, Restorative Sciences and Endodontics, School of Dentistry, University of Michigan
2016-2017	Adjunct Associate Professor of Anatomy and Cell Biology, School of Medicine, Indiana University School of Medicine
2016-2017	Adjunct Associate Professor of Biomedical Engineering, School of Engineering, Indiana University Purdue University
2016-2017	Associate Professor of Dentistry, with tenure, School of Dentistry, Indiana University
2014-2016	Adjunct Assistant Professor, Anatomy & Cell Biology, School of Medicine, Indiana University
2011-2016	Adjunct Assistant Professor, Biomedical Engineering, School of Engineering, Indiana University Purdue University
2010-2016	Assistant Professor, Dental Biomaterials, School of Dentistry, Indiana University

Summary of Evaluation:

Teaching: Professor Bottino is an excellent educator. He is the course director for one graduate course, Dental Biomaterials Sciences, and an instructor in a one pre-doctoral and one graduate-level course. In rank, he has mentored nine Ph.D. students, 15 graduate students, six pre-dental students, and nine post-doctoral fellows. He has mentored an additional 11 students in the Regenerative Dentistry Graduate Program that he inaugurated in 2018, and three visiting professors. Professor Bottino's teaching goal as a clinician-scientist is to translate the knowledge he obtains from his research to improve oral health and stimulate the next generation of researchers and dentist-scientists. Several of his students have won research awards at the local and national levels such as the American Dental Association Dentsply International Student Clinician award, International Academy of Dental Research Hatton finalist, and the International Academy of Dental Research Heraeus Kulzer Travel award. The impact that Professor Bottino has had on his mentees is demonstrated by many of the Ph.D. and post-doctoral fellows he has mentored who have obtained faculty and industry positions around the globe.

Professor Bottino's laboratory was the first at the University of Michigan to house a translatable platform that has the capacity to engineer three dimensional complex living tissues due to its unique ability to combine cell printing technologies with sophisticated biofabrication tools, and in 2018, he launched the first postgraduate certificate program in regenerative dentistry in the United States. Eleven students have completed this program including several international students.

Professor Bottino receives strong student and peer evaluations. Student comments reference his in-depth knowledge of the topic, clear instruction, and respect for his students. He has used feedback from his peers to increase classroom effectiveness.

Research: Since being at the University of Michigan in 2017, Professor Bottino has continued to develop a strong research program centered on dental biomaterials and craniofacial tissue engineering. He has branched into the important new research area of three dimensional bioprinting and scaffold fabrication using melt electrowriting. This has allowed the development of new types of scaffolds with aligned fiber orientation and nanostructured calcium phosphate with novel applications for periodontal tissue engineering, bioprinted scaffolds, hydrogels for craniofacial regeneration, and scaffolds for controlled antimicrobial drug delivery with applications for dental pulp regeneration. His research displays a steady trajectory and expansion into new areas of biofabrication and collaboration in areas of skin wound healing and the development of scaffolds to suppress the inflammation during persistent endodontic infections. His research has sighted him as an international leader in new biofabrication technologies in regenerative dentistry.

Professor Bottino has developed a highly successful research program that is centered on multidisciplinary collaborations, as demonstrated by multiple principal investigators, grants, and numerous publications with authors from several departments and schools. He lists a total of 135 publications, 62 of those he has published since being at the University of Michigan (2018). Most of the recent publications are in high-tier journals such as *Dental Materials*, *Acta Biomaterialia*, and *ACS Applied Materials & Interfaces*. He lists a total of nine book chapters. He currently has five federally funded grants as the principal investigator or co-principal investigator totaling \$7,373,024. Since in rank he has had six additional grants from institutions, industry, and federal foundations. His research is highly collaborative at the University of Michigan School of Dentistry and at the College of Engineering, Biomedical Engineering, as well as other universities and industries nationally and internationally. He is also the principal investigator on a Small Business Innovation Research grant-Strategies for Guided Bone Regeneration that is related to his affiliation with the start-up company, Matrigenix, Inc.

Recent and Significant Publications

Dubey N, Ferreira JA, Malda J, Bhaduri SB, Bottino, MC. Extracellular matrix/amorphous magnesium phosphate bioink for 3D bioprinting of craniomaxillofacial bone tissue. *ACS Appl Mater Interfaces* 2020;12(21):23752-23763.

Ribeiro JS, Bordini EAF, Ferreira JA, Mei L, Dubey N, Fenno JC, Piva E, Lund RG, Schwendeman A, Bottino MC. Injectable MMP-responsive nanotube-modified gelatin hydrogel for dental infection ablation. *ACS Appl Mater Interfaces* 2020;12(14):16006-16017.

Dubey N, Ferreira JA, Dagherery A, Aytac Z, Malda J, Bhaduri, SB, Bottino MC. Highly tunable bioactive fiber-reinforced hydrogel for guided bone regeneration. *Acta Biomater* 2020;113:164-176.

Dagherery A, Ferreira JA, de Souza Araújo IJ, Clarkson BH, Eckert GJ, Bhaduri SB, Malda J, Bottino MC. A highly ordered, nanostructured fluorinated CaP-coated melt electrowritten scaffold for periodontal tissue regeneration. *Adv Healthc Mater* 2021;e2101152.

Ferreira JA, Kantorski KZ, Dubey N, Dagherery A, Fenno JC, Mishina Y, Chan HL, Mendonca G, Bottino MC. Personalized and defect-specific antibiotic-releasing scaffolds for periodontal infection ablation. *ACS Appl Mater Interfaces* 2021;13(42): 49642-49657.

Service: Professor Bottino has a strong record of service at the school, university, national and international levels and is recognized as a leader in the dental community. He is a recent fellow of the American Dental Education Association Leadership Institute, which is a highly selective program for colleagues who show strong potential to become leaders in the field of Dentistry. He is a member of the Musculoskeletal Tissue Engineering Study Section of the National Institutes of Health. In addition, he has been member of seven editorial boards of reputable scientific journals, including the *Journal of Dental Research*. He has organized and chaired multiple symposia and oral sessions during the annual meetings of the International Association of Dental Research and the American Association for Dental, Oral and Craniofacial Research. Notably, he is the past president of the Dental Materials Group of the International Association for Dental Research, and he is currently the vice president of the Pulp Biology and Regeneration Group of the International Association for Dental Research, and the president of the American Association for Dental, Oral and Craniofacial Research, Michigan Chapter. He serves as member of the American Dental Association Standards Committee on Dental Materials. At the School of Dentistry, he serves as a member of the Research Committee, Research Administration Advisory Council, Oral Health Sciences Ph.D. program committee and he is a member of the Appointment, Promotions and Tenure Committee. Professor Bottino has been an invited speaker for numerous national and international conferences and professional meetings in many countries around the world, including South Korea, France, and Brazil.

External Reviewers:

Reviewer A: “Dr. Bottino has made novel discoveries in the areas of stem cell biology and tissue regeneration that will have major impacts on unmet clinical needs and patient care for periodontitis and bone injuries.”

Reviewer B: “It is evident that the move 4.5-years ago from Indiana University to the University of Michigan School of Dentistry has been extremely successful for Dr. Bottino, and his career has flourished, benefitting both himself and the faculty.”

Reviewer C: “Dr. Bottino is the first to introduce melt electrowriting technology to regenerative dentistry.”

Reviewer D: “Aside from his obvious strength in research, Marco is dedicated and loyal to academic and professional principles. He is a scholar who has made strong and consistent contributions at the University of Michigan.”

Reviewer E: “His contribution to teaching extends beyond the classroom as he has demonstrated innovation in the development of a new Regenerative Dentistry Graduate Program, which includes curriculum development, student recruitment and counseling and guidance, and other efforts that promote the educational mission of the school.”

Summary of Recommendation:

Professor Bottino is a valuable asset to the School of Dentistry. His mentoring has translated into many awards received by his students with high-impact scientific publications. He has made novel discoveries in the areas of stem cell biology and tissue regeneration that will have a major impact on patient care for periodontitis and bone injuries. He demonstrates exceptional contributions to service at all levels. It is with the support of the Executive Committee, that I recommend Marco Bottino for promotion to professor of dentistry, with tenure, School of Dentistry.



Jan Hu
Interim Dean, School of Dentistry

May 2023