# BIOMEDICAL SCIENCES (BMS)

## Department Chairpersons

**Homayon Asadi**
*Professor of Biomedical Sciences*

## Faculty

Homayon Asadi, Professor B.A., San Jose State University, 1984 | D.D.S., University of the Pacific, 1988

Takahiro Chino, Associate Professor B.D.S., Matsumoto Dental University, 1991 | Certificate, Matsumoto Dental University, 1993 | Certificate, University of Medicine & Dentistry of New Jersey, 2010 | D.D.S., Japanese Ministry of Health, Labour and Welfare, 1991 | M.S.D., Indiana University School of Dentistry, 1999 | Other, American Dental Education Association (ADEA)/Academy for Academic Leadership (AAL) Institute for Teaching and Learning (IRL), 2013 | Other, Indiana University School of Dentistry, 1996 | Ph.D., University of Washington, 2008

Luiz Coutinho Almeida da Silva Cassio, Assistant Professor B.Sc., Federal University of Rio de Janeiro, 2011 | Ph.D., Federal University of Rio de Janeiro, 2017 | S.M., Federal University of Rio de Janeiro, 2014

Dorothy Dechant, Adjunct Associate Professor, BMS B.A., University of California, Berkeley, 1973 | M.A., University of California, Berkeley, 1978 | Ph.D., University of California, Berkeley, 1982

Nejat Duzgunes, Professor, BS, Middle East Technical University, Ankara, Turkey, 1972 | Other, University of California, San Francisco, 1981 | PhD, State University of New York at Buffalo, 1978

Xiaoyuan Han, Assistant Professor B.S., China Pharmaceutical University, 2006 | M.S., China Pharmaceutical University, 2009 | Ph.D., University of the Pacific, 2014 | Postdoctoral training, Stanford University, 2019

Matthew Milnes, Instructor BS, California Lutheran University, 1997 | DDS, University of the Pacific School of Dentistry, 2003 | MS, University of the Pacific, 2000

David Ojcius, Professor BA, University of California, Berkeley, 1979 | PhD, University of California, Berkeley, 1986

Gary Richards, Professor B.A., University of California at Berkeley, 1980 | M.A., University of California at Berkeley, 1984 | PhD, University of California at Berkeley, 2007

Aline Souza, Assistant Professor B.Sc., Estacio de Sa University, 2010 | M.Sc., Universidade Federal do Rio de Janeiro, 2012 | Ph.D., Universidade Federal do Rio de Janeiro, 2016

Der Thor, Associate Professor BS, University of the Pacific, 2000 | MS, University of the Pacific, 2003 | PhD, University of the Pacific, 2009

Scott Turner, Assistant Professor A.B., Columbia University, 1994 | M.A., University of California, Berkeley, 1997

Nan Xiao, Associate Professor D.D.S., Peking University, 2003 | MS, Peking University - School of Stomatology, 2005 | PhD, Hong Kong University of Science and Technology, 2009

Benjamin Zeitlin, Associate Professor BSc, University of Strathclyde, 1992 | PhD, Sheffield Hallam University, 2000

## Course Descriptions

### Predoctoral Courses

**BMS 110. Clinical Pharmacology. 1 Unit.**
The course will focus on an overview of the foundational knowledge of pharmacology with an emphasis on content applicable to the day-to-day clinical practice of dentistry. The pharmacology component of the course will center on dental drug knowledge and recognition including dosing and adverse events. The general principles of drug action, including pharmacokinetics and pharmacodynamics of dental drug categories will be addressed. This will include a focus on common drug interactions with dental drugs.

**BMS 120. Genetics. 1 Unit.**
The course will introduce the genetic basis of human disease and provide students with fundamental knowledge of genetics in relation to dental conditions and their causes, genetic testing, and possible prevention. Students begin by reviewing the scientific basis of human and molecular genetics, continue with common diseases and those inherited in a Mendelian fashion, such as hemophilia, sickle cell disease, phenylketonuria, and others. The course will provide a foundational overview of clinical genetics and dysmorphology and review the characteristics of the most common craniofacial genetic disorders and conditions related to oral and dental health. The potential for personalized and precision medicine as well as personal genomics will be discussed. The course concludes with an overview of genetic screening, testing, counseling, and ethical and legal issues related to human genetics.

**BMS 123. Anatomy and Histology. 8 Units.**
The student will gain an understanding of functional histology and gross anatomy of the human body as appropriate for professional health care providers. Emphasis will be on the integration of anatomical knowledge at all levels and its correlation with basic clinical medicine relevant to dentistry.

**BMS 124. Applied Biochemistry. 2 Units.**
The study of major molecular structures and processes of the human organism. Muscles, neurons, action potentials, extracellular matrix. Additional topics covered are enzymes, pharmacology, pharmacodynamics, pharmacokinetics, anesthesia, and pain.

**BMS 130. Applied Physiology. 4 Units.**
Clinical application of physiology based on integrated basic biomedical science, including Physiology, Biochemistry, Anatomy and Histology; with specific focus on urinary system, blood vessels and lymphoid organs, heart, GI tract, liver, pancreas, gall bladder, airways and endocrinology.

**BMS 133. Applied Orofacial Anatomy. 7 Units.**
The student will gain a fundamental understanding of head and neck embryology, gross anatomy, oral histology as is appropriate for dental healthcare providers. Emphasis will be placed on the integration of anatomical and functional histological knowledge of the orofacial complex at all levels with basic clinical dentistry and medicine. The establishment of clinical correlations with radiographic interpretation, local anesthesia administration and the overall health will be a strength of this course.

**BMS 143. Applied Oral Biology. 1 Unit.**
The focus of this course is to provide the fundamental concepts of applied oral biology for understanding and application of clinical dentistry. Topics include biochemistry of saliva and hydroxy apatite, gene expression, special senses, central nervous system and salivary gland.

**BMS 220. Pharmacology. 5 Units.**
Introduction to pharmacology. Pharmacodynamics; pharmacokinetics; local anesthesia; analgesics; prescription writing; anxiolytics; cardiovascular pharmacology; drug interactions; antibiotics; autonomics; immunopharmacology; drugs and hematology, pregnancy, aging; asthma and COPD; antihistamines; corticosteroids; calcium regulation; antifungals, antivirals; alternative therapy; gastrointestinal pharmacology; nitrous; anticancer drugs; general anesthetics; thyroid drugs; neuromuscular; anti-Parkinsons, anti-Alzheimers; psychosis; anti-seizures; anti-sposmatic; substance abuse; opioid crisis; diabetes.

**BMS 232. Immunology & Microbiology. 3 Units.**
Introduction to immunology and microbiology, immunity to infection, oral microbiology and immunology, and dental plaque.

**BMS 233. Virology & Mycology. 1 Unit.**
Introduction to virology and mycology, immunity to viral and fungal infection, oral virology and mycology.

**BMS 234. Application of Integrated Biomedical Sciences. 5 Units.**
BMS 234 is a hybrid course. All aspects of this course will be online with the exception of quizzes and exams. Students will apply and integrate knowledge taught in didactic courses to learn and understand medical conditions. This course will expose students to over 150 medical conditions and the process of preparing peer-reviewed literature. All learning will be independent. Students will rely mostly on their peers and knowledge accumulated in didactic courses to help guide their learning. The medical conditions to be learned during this course are divided into two sets, medical conditions A (MC-A) and medical conditions B (MC-B). For MC-A, student will select one medical condition from a list and generate a guided report which will be peer-reviewed and edited. These reports will be shared with the class for learning. Formative assessment will be online through Canvas. Summative assessment will be through ExamSoft cumulative of all information relevant to the medical conditions. MC-B are a select list of medical conditions that have significant relevance to dentistry. Accumulating information on and learning of these select medical conditions will be the responsibility of each student. These tasks will be accomplished independently of instructors. Understanding of these medical conditions will be formatively assessed through oral examination. Any aspect of these medical conditions may be asked during the oral exam. Passing of oral exam is required to pass the course. Summative assessment will test students' ability to apply this knowledge to understanding medical and dental cases.

## Graduate Courses

**AN 410. Advanced Head and Neck Anatomy I. 1 Unit.**
This course presents head and neck anatomy in depth to provide residents essential foundation for dental procedures. The development of normal and pathological craniofacial shapes, as well as anatomical structures relevant for implant placement, are discussed in detail. (Quarter 1.).

**BMS 400. Directed or Independent Research. 2-10 Units.**
Approved directed or independent research on existing or emerging topics in the biomedical, clinical, or educational fields.

**BMS 401. Research Philosophy and Design I. 1 Unit.**
In this two-quarter foundational course, students learn about hypothesis-driven research, including hypothesis development and significance testing. (Quarter 1.).

**BMS 440. Thesis Protocol. 1 Unit.**
In this independent-study research course, residents work with mentor(s) to develop research questions, formulate hypotheses, and write a formal research proposal that includes a full literature review, statement of material and methods, execution of the research, and appropriate analysis and interpretation of data. (Quarter 2.).

**BMS 450. Research Project I. 3 Units.**
In this independent-study research course, residents work with research mentors to perform the research project, including data gathering, complilation, and interpretation of the results. The course will culminate in a publishable manuscript.(Quarters 1-4.).

**BMS 502. Biomedical Science. 1 Unit.**
The course will review the embryology, anatomy, bone biology, microbiology, immunology, pathology for dental profession. Emphasis will be on the integration of biomedical sciences knowledge and their relationship with oral health in clinical orthodontics.

**BMS 550. Research Project II. 3 Units.**
In this independent-study research course, residents work with research mentors to perform the research project, including data gathering, complilation, and interpretation of the results. The course will culminate in a publishable manuscript. (Quarters 5-8.).

**BMS 651. Manuscript Preparation. 3 Units.**
Residents prepare the final version of a publishable manuscript. (Quarter 9.).