

**Barbara D. Boyan**  
**William H. and Alice T. Goodwin Chair in Biomedical Engineering**  
**Dean, College of Engineering**  
**Virginia Commonwealth University**  
**February 28, 2018**

**I. Earned Degrees**

1970	B.A., Biology	Rice University, Houston, Texas
1974	M.A., Comparative Biochemistry and Physiology	Rice University, Houston, Texas
1975	Ph.D., Comparative Biochemistry and Physiology	Rice University, Houston, Texas
1974-1977	Postdoctoral Fellow, Calcification Mechanisms	Dental Science Institute The University of Texas Health Science Center at Houston

**II. Employment**

2013-present	Alice T. and William H. Goodwin Chair in Biomedical Engineering	Virginia Commonwealth University (VCU), Richmond, Virginia
2013-present	Dean, College of Engineering	VCU
2013-present	Adjunct Professor, Departments of Pediatrics, Biochemistry, and Orthopaedics, Medical School	VCU
2013-present	Professor Emerita, Department of Biomedical Engineering; School of Materials Science and Engineering; and School of Biology	Georgia Institute of Technology Atlanta, Georgia
2013-present	Director, Virginia Site Atlantic Pediatric Device Consortium	VCU
2011-2013	Executive Director, Atlanta Pediatric Device Consortium	Georgia Institute of Technology Atlanta, Georgia
2010-2013	Director, Georgia Tech/Children's Healthcare of Atlanta Center for Pediatric Healthcare Technology Innovation	Georgia Institute of Technology Atlanta, Georgia
2010-2013	Executive Director, Translational Research Institute for Biomedical Engineering and Science	Georgia Institute of Technology Atlanta, Georgia
2008-2013	Director, Center for Advanced Bioengineering for Soldier Survivability	Georgia Institute of Technology Atlanta, Georgia
2008-2013	Associate Dean for Research and Innovation College of Engineering	Georgia Institute of Technology Atlanta, Georgia
2006-2013	Director Children's Healthcare of Atlanta Laboratory for Craniofacial Plastic Surgery Research	Georgia Institute of Technology Atlanta, Georgia
2005-2013	Adjunct Professor School of Biology	Georgia Institute of Technology Atlanta, Georgia
2004-2013	Adjunct Professor School of Materials Science and Engineering	Georgia Institute of Technology Atlanta, Georgia

2002-2013	Professor Georgia Institute of Technology Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech / Emory University	Atlanta, Georgia
2002-2013	Price Gilbert, Jr. Chair in Tissue Engineering Georgia Research Alliance Eminent Scholar	Georgia Institute of Technology Atlanta, Georgia
2002-2008	Deputy Director for Research Georgia Tech / Emory Center for the Engineering of Living Tissues	Georgia Institute of Technology Atlanta, Georgia
2003-present	Adjunct Professor  Departments of Orthopaedics and Cell Biology	Emory University Medical School Atlanta, Georgia
1992-present	Adjunct Professor Department of Periodontics	The University of Texas Health Science Center at San Antonio
2001-2002	Vice Chair for Research Department of Orthopaedics	The University of Texas Health Science Center at San Antonio
1992-2001	Director Center for Enhancement of the Biology/Biomaterials Interface	The University of Texas Health Science Center at San Antonio
1988-2002	Professor Departments of Orthopaedics and Biochemistry	The University of Texas Health Science Center at San Antonio
1988-2001	Director of Research Department of Orthopaedics	The University of Texas Health Science Center at San Antonio
1986-2001	Director Industry-University Cooperative Research Center	The University of Texas Health Science Center at San Antonio
1985-1988	Adjunct Associate Professor Department of Orthopaedics	The University of Texas Health Science Center at San Antonio
1984-1990	Adjunct Faculty Minority Basic Research Grant Program	Incarnate Word College San Antonio, Texas
1982-2002	Member, Graduate Faculty Graduate School of Biomedical Sciences	The University of Texas Health Science Center at San Antonio
1981-1988	Associate Professor Departments of Periodontics and Biochemistry; Tenure, 1984	The University of Texas Health Science Center at San Antonio
1977-1980	Assistant Professor Department of Microbiology and Dental Science Institute Faculty	Dental Branch The University of Texas Health Science Center at Houston
1977-1981	Faculty The University of Texas Health Graduate School of Biomedical Sciences	Science Center at Houston

1975-1980	Supervisor Electron Microscopy Laboratory	Dental Science Institute Houston, Texas
1974-1977	Research Associate/Postdoctoral Fellow	Dental Science Institute Houston, Texas
1970-1974	Predocotrinal Trainee Department of Biology	Rice University, Houston, Texas

## **OTHER EMPLOYMENT**

2012-present	Director and Chief Scientific Officer, Cartiva, Inc., Alpharetta, GA
2007-present	Co-Founder, Director and Chief Scientific Officer, SpherIngenics, Inc., Atlanta, GA
2007-present	Independent Director, Board of Directors, Carticept Medical, Inc., Atlanta, GA
2006-2007	Independent Director, Board of Directors and Chief Scientific Officer, IsoTis, Inc., Irvine, CA (publicly traded company acquired by Integra, Inc., December 2007)
2006-2007	Independent Director, Board of Directors, IsoTis SA, Lausanne, Switzerland
2004-2014	Independent Director, Board of Directors, ArthroCare Corporation, Austin, TX (ARTC, a publicly traded mid-cap medical device company, was acquired by Smith & Nephew, June, 2014)
2003-2007	Co-Founder and Chief Scientific Officer, Orthonics, Inc., Atlanta, GA (technology acquired by Carticept Medical, 2007)
1996-1997	Co-Founder and Chairman, Board of Directors, OsteoBiologics, Inc., San Antonio, TX (acquired by Smith & Nephew)
1987-1989	Co-Founder and Chief Scientific Officer, Biomedical Development Corporation, San Antonio, TX

## **CURRENT CONSULTANTSHIPS**

Consultant, Titan Spine LLC, Mequon, WI  
 Consultant, Exactech, Alachua, FL  
 Consultant, Spineology, Inc.  
 Consultant, Depuy Orthopaedics, Warsaw, IN  
 Consultant, Institut Straumann AG, Basel, Switzerland  
 Consultant, Henry Schein, New York City  
 Consultant, Musculoskeletal Transplant Foundation, Edison, NJ

## **BOARDS of DIRECTORS (2010-2017)**

### For Profit:

Arthrocare Corporation, acquired by Smith & Nephew, June, 2014  
 Carticept Medical, Alpharetta, GA  
 Cartiva Inc., Alpharetta, GA  
 SpherIngenics, Inc., Richmond, VA

### Not for Profit:

International Conference on the Chemistry and Biology of Mineralized Tissue (immediate past president)  
 Virginia Academy of Science, Engineering, and Medicine  
 Commonwealth Center for Advanced Manufacturing

### III. TEACHING

#### A. Individual Student Guidance

Note: Only primary advisorships are listed. While at Georgia Tech, Dr. Boyan served as a committee member on numerous Ph.D. and M.S. thesis committees in BME, MSE, and Biology. She continues as primary advisor for three Georgia Tech Ph.D. students and as co-advisor for two others. Each graduate student and post-doctoral fellow in her laboratory supervises 1-2 undergraduate research fellows including Presidential Undergraduate Research Award (PURA), Petit Scholars, Research Experience for Undergraduates (REU), and Undergraduate Research Scholarship (URS) awardees.

As a faculty member at VCU, Dr. Boyan is primary advisor for four PhD students (1 in BME, 1 in Chem E, 1 in Biochemistry, and 1 in Integrated Life Sciences). She co-advises an additional BME PhD student. As at Georgia Tech, all PhD students in her lab serve as mentors for undergraduate students and high school students.

#### **Ph.D. Theses Directed** (Committee Chairperson)

##### Virginia Commonwealth University

Shirae Leslie, Chemical Engineering, 2013-2016

Ethan Lotz, BME, 2013-present

Ryan Clohessy, BME, 2013-present; co-mentor: Zvi Schwartz

Kayla Scott, BME, 2015-present

##### Georgia Institute of Technology

Bryan Bell, M.S., BioE/MSE, 2003-2009, Ph.D.

Jiaxuan Chen, Ph.D. in BME, 2007-2012, Ph.D.

Reyhaan Chaudhri, Biology, 2007-2013, Ph.D.

Tracy Denison, BioE/BME, 2003-2009, Ph.D.

Maryam Doroudi, Biology, 2009-2014, Ph.D.

Khairat ElBaradie, Biology, 2007-2012, Ph.D.

Tanya Farooque, ChBE, 2005-2009, Ph.D., co-mentor: Timothy Wick

Rolando Gittens, BioE/MSE, 2007-2013, Ph.D.

Christopher Hermann, MD/PhD in BioE, 2008-2012, Ph.D.

Erin Hewett Lee, BME/PKU, 2010-2016

Jennifer Hurst-Kennedy, Biology, 2006-2009, Ph.D.

Ramsey Kinney, BME, 2002-2007, Ph.D.

Christopher S.D. Lee, BME, 2007-2012, Ph.D.

Jung Hwa Park, MSE, 2007-2012, Ph.D.

Brandy Rogers, BioE/BME, 2006-2013, Ph.D.

Kathryn Smith, ME, 2007-2010, Ph.D., co-mentor: Ken Gall

Ge "Alice" Zhao, BioE/BME, 2004-2008, Ph.D.

Ming Zhong, BioE/BME, 2007-2009, Ph.D.

Andrew L. Raines, BioE/BME, 2005-2011, Ph.D.

James Wade, BME, 2010-present, co-mentor: Eberhard Voit

Qingfen Pan, Mechanical Engineering, 2009-2015

Alice Cheng, BME/PKU, 2011-2016

Xioakun Wang, PKU/BME, 2011-2012, Ph.D., co-mentor: Haifeng Chen (PKU)

Marcus Walker, Bioengineering/Electrical Engineering, 2013-present, co-mentor: Brani Vidakovic

##### University of Texas Health Science Center at San Antonio

Tom Hummert, D.D.S., Ph.D., "Response of Osteoblasts to Material Surfaces,"

Dept. of Biochemistry, 1992-2001

John Schmitz, D.D.S., M.S., Ph.D., "Regulation of Matrix Metalloproteinases in Chondrocytes,"

Biochemistry, 1987-1993.

#### **Masters' Theses Directed** (Committee Chairperson)

##### Georgia Institute of Technology

Jiaying Guo, Biology, 2007-2009

Mimi Fang, BME, 2005-2009

Maya Fisher, Biology, 2007-2009  
 Sharon Hyzy, Biology, 2009-2012  
 Jessica Mata, BME, 2005-2009  
 Meredith Myers, MSE, 2009-2011  
 Kevin Wong, BioE/BME, 2004-2010  
 Ge "Alice" Zhao, BioE/BME, Georgia Tech, 2002-2004  
 Ming Zhong, BioE/BME, 2005-2006  
 Henry Mei, ECE, 2012-2103  
 Marcus Walker, ECE, 2012-2013  
 Shirae Leslie, BME, 2009-2012, M.S.

University of Texas Health Science Center at San Antonio

Derrek Henrie, D.D.S., Department of Periodontics, UTHSCSA, 2002-2003.  
 Haris Ehland, D.D.S., "The Role of MAP Kinase as Mediator of the Effect of Vitamin D<sub>3</sub> Metabolites on Growth Plate Chondrocytes," Dept. Periodontics, UTHSCSA, 2000-2003.  
 Elizabeth M. Tandy, D.D.S., "The Effect of Surface Roughness on Responsiveness of Human Female Osteoblasts to 17 $\beta$ -Estradiol," Dept. Periodontics, UTHSCSA, 2000-2003.  
 Enrique E. Rosado, D.D.S., "Osteoinductive Properties of Molecule P-15 and Implant Surfaces in the Nude Mouse," Dept. Periodontics, UTHSCSA, 2000-2003.  
 Todd A. Keller, D.D.S., Dept. Prosthodontics, UTHSCSA, 2000-2003.  
 Edith Jennings Graham, D.D.S., Department of Periodontics, UTHSCSA, 2001-2004.  
 Sharon Bannister, D.D.S., "Titanium Surface Roughness Modulates the Response of Human Osteoblast-like (MG63) Cells to Shear Force," Dept. Periodontics, UTHSCSA, 1999-2002.  
 John Walton, D.D.S., "The Membrane-associated Effects of 17 $\beta$ -estradiol-BSA on Chondrocyte Phenotypic Expression," Dept. of Prosthodontics, UTHSCSA, 1999-2002.  
 Theodore Weesner, "The Osseoinductive Potentials of Freeze-Dried Bovine Xenograft and Enamel Matrix Protein Derivative," Dept. of Periodontics, 1997-2000.  
 Marc A. Sisk, D.D.S., "The Relative Roles of Prostaglandin E<sub>2</sub>, Protein Kinase A and Protein Kinase C in Regulating the Response of MG63 Osteoblast-like Cells to Implant Surface Roughness and 1,25-(OH)<sub>2</sub>D<sub>3</sub>," Dept. Periodontics, UTHSCSA, 1998-2001.  
 Paul DeVeau, "Mechanism of Action of 1,25-(OH)<sub>2</sub>D<sub>3</sub> and 24,25-(OH)<sub>2</sub>D<sub>3</sub> Vitamin D on Chondrocytic Development", Dept. of Periodontics, UTHSCSA, 1998-2001.  
 Jack Lincks, D.D.S., "Effect of Titanium Alloy Surfaces on Chondrocyte Differentiation", Dept. of Periodontics, UTHSCSA, 1996-1999.  
 Douglas Curry, D.D.S., "Mechanism of 1,25-(OH)<sub>2</sub>D<sub>3</sub> Signal Transduction," Dept. of Periodontics, UTHSCSA, 1996-1999.  
 Ann Somers, D.D.S., "Effect of Donor Age on the Ability of Demineralized Freeze-dried Bone Allograft to Induce Bone and Cartilage Formation," Dept. of Periodontics, UTHSCSA, 1995-1998.  
 Gary M. Piorkowski, D.D.S., "The Effects of rhBMP-2 and TGF- $\beta$  on the Maturation of Costochondral Resting Zone Chondrocytes," Dept. of Periodontics, UTHSCSA, 1995.  
 Richard Batzer, D.D.S., "Effects of Calcium Phosphate Crystallinity and Titanium Surface Roughness on Growth and Differentiation of Osteoblasts *in Vitro*," Dept. of Prosthodontics, UTHSCSA, 1995-1998.  
 Daniel Greising, D.D.S., "Genomic and Nongenomic Regulation of Chondrocyte Differentiation and Proliferation by Different Analogues of Vitamin D<sub>3</sub>," Dept. of Periodontics, UTHSCSA, 1994-1997.  
 Steven Helm, D.M.D., "Protein Kinase C Localization, Regulation, and Mechanism of Action on Major Substrates in Rat Costochondral Chondrocytes," Dept. of Periodontics, UTHSCSA, 1994-1997.  
 Bryan Ellis, D.D.S., "The Role of Protein Kinase C in Vitamin D-mediated Signal Transduction in Chondrocytes," Dept. of Periodontics, UTHSCSA, 1993-1996.  
 Janet Martin, "The Effect of Titanium Surfaces on the Growth and Differentiation of Cartilage and Bone Cells *in Vitro*," Dept. of Periodontics, UTHSCSA, 1993-1996.  
 Scott Mackey, D.D.S., "Effect of Transforming Growth Factor Beta and Vitamin D<sub>3</sub> Metabolites on Protein Kinase C Mediated Signal Transduction in Rat Costochondral Chondrocyte Cultures," Dept. of Periodontics, UTHSCSA, 1992-1995.

- Douglas Erickson, "Regulation of Growth Zone and Resting Zone Chondrocytes by Bone Morphogenetic Protein," Dept. of Prosthodontics, UTHSCSA, 1992-1995.
- Ridge Gilley, "Prostaglandin E<sub>2</sub> Regulation of Chondrocyte Proliferation and Differentiation," Dept. of Periodontics, UTHSCSA, 1991-1994.
- Gary Braun, "The Effect of Titanium, Hydroxyapatite, and Stainless Steel Implants on Normal Bone Healing in the Rat Ablation Model," Dept. of Prosthodontics, UTHSCSA, 1991-1994.
- Jeffrey Hambleton, "Modulation of Chondrocyte Differentiation by Culture on Sputter-coated Surfaces," Dept. of Periodontics, UTHSCSA, 1990-1993.
- Dennis Kelly, "Response of Chondrocytes to PGE<sub>2</sub>," Dept. of Prosthodontics, UTHSCSA, 1990-1993.
- Garth Griffiths, "Regulation of Alkaline Phosphatase and Calcifiable Proteolipid in *Escherichia coli* K-12 Wild Type and Pho-Regulon Mutants," Dept. of Periodontics, UTHSCSA, 1990-1993.
- Scott Semba, "The Role of Cyclic AMP and Its Relationship to Parathyroid Hormone Response in an *in Vitro* Model of Chondrogenesis," Dept. of Periodontics, UTHSCSA, 1989-1992.
- Tom Marshall, "Matrix Vesicle Enzyme Activity and Phospholipid Content in Endosteal Bone Following Implantation of Bonding and Non-bonding Implant Materials," Dept. of Prosthodontics, UTHSCSA, 1989-1990.
- Susan Martin, "Effect of Diet on Tibial Dyschondroplasia in Chickens," Incarnate Word College, 1989.
- Greg Langston, "The Role of Calcium Influx and Its Relationship to Vitamin D Response in an *in Vitro* Model of Chondrogenesis," Dept. of Periodontics, UTHSCSA, 1987-1989.
- Ray Hancock, "Development of a New *In Vitro* Assay of Chondrocyte Calcification to Study Cellular Response to Chondrogenic Factors," Dept. of Periodontics, UTHSCSA 1987-1989.
- Dixie Schlader, "Direct Effects of Vitamin D Metabolites on Matrix Vesicles," Incarnate Word College, 1987-1988.
- Terrell Cohen, "Isolation and Characterization of Chick Epiphyseal Cartilage Matrix Vesicle Proteolipid," Dept. of Periodontics, UTHSCSA, 1985-1988.
- J. Luis De La Cruz, "Effect of Hypomagnesemia on Bone Metabolism," Incarnate Word College, 1984-1987.
- Faye Fegley, "Mesenchymal Tissue Response to Heterotopically Placed Demineralized Bone Powder Particles in the Rat," Dept. of Periodontics, UTHSCSA, 1984-1987.
- Bryan Pearson, "The Fibronectin Binding Capacity of Demineralized Bone and Dentin," Dept. of Periodontics, UTHSCSA, 1984-1987.
- Nancy Newhouse, "*In vivo* Response of Chronic Periodontal Defect Tissue to Bone Morphogenetic Protein," Dept. of Periodontics, UTHSCSA, 1983-1985.

#### University of Texas Houston Health Science Center

- David May, "Phospholipase Activity in *Bacterionema matruchotii*," Dept. of Periodontics, UTHSC/H, 1980-1983.
- Michael Florence, "Quantitative Analysis of Calcifiable Membrane Phospholipids during *Bacterionema matruchotii* Culture Growth," Dept. of Periodontics, UTHSC/H, 1980-1983.
- Gary Arthur Anderson, "Proteolipid Concentration and Calcification During Sequential Development of Fetal Calf Growth Plate," Dept. of Periodontics, UTHSC/H, 1979-1982.
- Erwin Weichel, "The Effect of Specific Phospholipases on the Ability of Bacterial Proteolipids to Initiate *in Vitro* Calcification," Dept. of Periodontics, UTHSC/H, 1978-1981.
- John Rapley, "The Effect of Scyllo-inositol on *Bacterionema matruchotii* Calcification," Dept. of Periodontics, UTHSC/H, 1978-1981.
- Richard Howell, "Comparison of Calcification between *Bacterionema matruchotii* and *Actinomyces naeslundii*," Dept. of Periodontics, UTHSC/H, 1977-1980.

#### **Current Postdoctoral Fellows**

- Michael McClure, Ph.D., 2013-2016  
 David J. Cohen, M.D., 2012-present  
 Tea Arapovic, Ph.D., 2013-2014

#### **Recent Postdoctoral Fellows**

- Janina Sedlaczek, M.D., 2012-2013

Arun Srinivasan, M.D., 2011-2012  
 Scott Cuda, M.D., 2010-2011  
 David Deutsch, M.D., 2011-2012  
 Steffen Drange, M.D., 2010-2011  
 John Kalisvaart, M.D., 2010-2011  
 Yun Wang, Ph.D., 2007-2012  
 Rene Olivares-Navarrete, D.D.S., Ph.D.

### **Past Visiting Faculty**

Antonella Motta, Ph.D., Associate Professor, University of Trento, Italy, 2007  
 Jida Chen, Ph.D., Professor, Department of Biomaterials, Chongqing University, Chongqing, China, 2006-2008  
 Amani Mostafa, Ph.D., Associate Professor, National Research Center, Cairo, Egypt, 2006  
 Zvi Schwartz, D.M.D., Ph.D., Hebrew University Hadassah

### **Current Positions of Former Postdoctoral Fellows**

Jonathan Kaye, M.D., private practice of pediatric urology, Dallas, TX  
 Hunter Moyer, M.D., plastic surgery residency, Emory University College of Medicine  
 Kimberly Singh, M.D., plastic surgery residency, Emory University College of Medicine  
 Anna Fallon, Ph.D., Industry  
 Hai Yao, PhD, Assistant Professor, Department of Bioengineering, Clemson University  
 Liping Wang, MD, PhD, Staff Scientist, VA Medical Center, and Department of Orthopaedics, Stanford Medical School, Palo Alto, CA  
 Larry Swain, DDS, Vice President, Kinetic Concepts, Inc, San Antonio, TX  
 Zvi Schwartz, DMD, PhD, Visiting Professor, Georgia Institute of Technology and Professor Emeritus, Hebrew University  
 Isabel Gay, DDS, MS, Professor, Department of Periodontics, Dental School, University of Texas Houston Health Science Center  
 Yuhong Liu, MD, Research Instructor, Department of Physiology, San Antonio, TX  
 Simon van Dijk, PhD, Assistant Professor, Northwest Vista College, San Antonio, TX  
 Hugo Pedrozo, PhD, Senior Scientist, Depuy, Inc., Warsaw, IN  
 Shingo Maeda, MD, Private Practice of Orthopaedics, Sendai, Japan  
 Christoph Lohmann, MD, Chairman of Orthopaedics, George August University, Magdebourg, Germany  
 Stefan Lossdorfer, DDS, MS, Department of Orthodontics, University of Bonn, Germany  
 Jose Romero, MD, Associate Professor of Orthopaedics, University of Zurich, Switzerland  
 Heinrich Guerkov, MD Orthopaedics, The Netherlands  
 Scott Mackey, DDS, MS, Director of Periodontics Postgraduate Program, Wilford Hall Medical Center, Lackland Air Force Base, San Antonio, TX  
 Thomas Hummert, DDS, PhD, Assistant Professor of Prosthodontics, University of North Carolina at Chapel Hill, Raleigh, NC  
 John Rapley, DDS, MS, Chairman, Department of Periodontics, Dental School, University of Missouri at Kansas City  
 Kristine Kieswetter, PhD, Senior Scientist, Kinetics Concepts, Inc., San Antonio, TX  
 Douglas Erickson, DDS, MS, Faculty, Prosthodontics Program, USAF, Wilford Hall Medical Center, Lackland, TX  
 Victor Sylvia, PhD, Associate Professor, Department of Orthopaedics, UTHSCSA, San Antonio, TX  
 John Schmitz, DDS, PhD, Associate Professor, Department of Oral and Maxillofacial Surgery, UTHSCSA and private practice of oral surgery, San Antonio, TX  
 Aruna Khare, PhD, Director of Research, Diagnostics Systems Laboratories, Webster, TX  
 Fidel Del Toro, DDS, PhD, Professor, Department of Orthodontics, UTHSCSA and private practice of orthodontics, Austin, TX.

### **B. Other Teaching Activities (Classroom/Laboratory)**

<u>Year</u>	<u>Course Title</u>	<u>Role</u>
<u>Georgia Institute of Technology</u>		

2008 to present:	Guest Lecturer in Physiology, Pathophysiology in BME PhD program and in MSE and BME undergraduate survey courses	
	Undergraduate Research Fellows in BME, Biology, and MSE	
2008 Summer	BME Abroad	Co-Director
2008 Spring	Systems Physiology I: The Cell (BMED 3160)	Director
2008 Spring	Introductions to Materials Science	Lecturer
2008 Spring	Pathophysiology	Lecturer
2008 Spring	Bone and Muscle Physiology	Lecturer
2008 Spring	Animal Models	Lecturer
2007 Fall	Systems Physiology I: The Cell (BMED 3160)	Director
2007 Spring	Introduction to Materials Science	Lecturer
2007 Spring	Systems Physiology I- Cell Biology (BMED 3160)	Director
2007 Spring	Physiology	Lecturer
2007 Spring	Pathophysiology	Lecturer
2006 Spring	Physiology	Lecturer
2006 Spring	Systems Physiology I- Cell Biology (BMED 3160)	Director
2006 Fall	Systems Physiology I- Cell Biology (BMED 3160)	Director
2005 Spring	Introduction to Materials Science	Lecturer
2005 Spring	Systems Physiology I- Cell Biology (BMED 3160)	Director
2005 Spring	Physiology	Lecturer
2004 Fall	Intro to Bioengineering	Lecturer
2004 Spring	Physiology	Lecturer
2004 Fall	Systems Physiology I- Cell Biology (BMED 3160)	Director
2003 Spring	Physiology	Lecturer
2003 Spring	Systems Physiology I- Cell Biology (BMED 3160)	Director
2003 Fall	Systems Physiology I- Cell Biology (BMED 3160)	Co-Director
2003 Fall	Intro to Bioengineering	Lecturer
2002 Fall	Intro to Bioengineering	Lecturer

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1998-2002 Fall	Dental Biochemistry	Lecturer
1997 Fall	Orthopaedic Basic Science	Lecturer
1997 Fall	Dental Biochemistry	Lecturer
1997	Resident Research Rotation	Advisor
1997 Summer	Orthopaedic Research	Director
1996 Fall	Orthopaedic Basic Science	Lecturer
1996 Fall	Dental Biochemistry	Lecturer
1996	Resident Research Rotation	Advisor
1996 Summer	Orthopaedic Research	Director
1995 Fall	Orthopaedic Basic Science	Lecturer
1995 Fall	Dental Biochemistry	Lecturer
1995	Resident Research Rotation	Advisor
1995 Summer	Orthopaedic Research	Director
1994 Winter	Fracture and Fracture Healing	Lecturer
1994 Fall	Orthopaedic Basic Science	Lecturer
1994 Fall	Dental Biochemistry	Lecturer
1994 Summer	Orthopaedic Research	Director
1994 Spring	Biochemistry of the Extracellular Matrix	Director
1993 Fall	Research Internship (Ron Caloss)	Director
1993 Fall	Dental Biochemistry	Lecturer
1993 Spring	Dental Research	Director
1993 Spring	Orthopaedic Research	Director
1992 Fall	Dental Biochemistry	Lecturer
1992 Summer	Dental Research	Director
1992 Summer	Orthopaedic Research	Director
1992 Spring	Dental Research	Director
1992 Spring	Orthopaedic Research	Director



1991 Winter	Biochemistry of the Extracellular Matrix	Director
1991 Fall	Postdoctoral Dental Core	Lecturer
1991 Fall	Dental Biochemistry	Lecturer
1991 Summer	Dental Research	Director
1991 Summer	Orthopaedic Research	Director
1990 Fall	Dental Biochemistry	Lecturer
1990 Summer	Dental Research	Director
1990 Summer	Orthopaedic Research	Director
1989 Fall	Dental Biochemistry	Lecturer
1989 Summer	Dental Research	Director
1989 Summer	Orthopaedic Research	Director
1989 Fall	Orthopaedic Basic Science	Lecturer
1988 Fall	Dental Biochemistry	Lecturer
1989 Spring	Postdoctoral Dental Biochemistry	Co-Director
1989 Spring	Biochemistry of Connective Tissues	Director
1988 Spring	Freshman Periodontics	Lecturer
1988 Spring	Postdoctoral Dental Biochemistry	Co-Director
1988 Spring	Biochemistry of the Extracellular Matrix	Director
1987 Fall	Orthopaedic Basic Science	Lecturer
1987 Fall	Dental Biochemistry	Lecturer
1987 Spring	Postdoctoral Periodontics	Lecturer
1987 Spring	Freshman Periodontics	Lecturer
1986 Fall	Preventive Dentistry	Lecturer
1986 Spring	Postdoctoral Dental Biochemistry	Co-Director
1986 Fall	Dental Biochemistry	Lecturer
1986 Spring	Sophomore Periodontics	Lecturer
1986 Spring	Postdoctoral Dental Biochemistry	Director
1985 Fall	Dental Hygiene	Lecturer
1985 Fall	Preventive Dentistry	Lecturer
1985 Fall	Biochemistry of the Extracellular Matrix	Director
1985 Fall	Postdoctoral Periodontics Seminar-	Lecturer
1985 Fall	Dental Biochemistry	Lecturer
1985 Spring	Postdoctoral Dental Biochemistry	Director
1985 Spring	Research Topics in Periodontics	Director
1984 Fall	Biochemistry of Mineralized Tissues for Orthopaedic Residents	Director
1984 Fall	Postdoctoral Dental Microanatomy	Lecturer
1984 Fall	Dental Biochemistry	Lecturer
1984 Fall	Dental Hygiene	Lecturer
1984 Fall	Community Dentistry	Lecturer
1984 Spring	Postdoctoral Dental Biochemistry	Director
1984 Spring	Research Topics in Periodontics	Director
1984 Spring	Biomembranes	Lecturer
1984 Spring	Postdoctoral Dental Biochemistry	Director
1984 Spring	Research Topics in Periodontics	Director
1984 Spring	Microbial Physiology	Lecturer
1983 Fall	Dental Biochemistry	Lecturer
1983 Fall	Proteolipid Structure and Function	Director
1983 Fall	Sophomore Periodontics	Lecturer
1983 Fall	Community Dentistry	Lecturer
1983 Fall	Dental Hygiene Periodontics	Lecturer
1983 Fall	Advanced Periodontics	Lecturer
1983 Spring	Postdoctoral Dental Biochemistry	Co-Director
1983 Spring	Research Topics in Periodontics	Director
1983 Spring	Biochemistry Laboratory Rotation	Advisor
1983 Spring	Microbial Physiology	Lecturer
1983	Table Clinic Elective	Advisor

1982 Fall	Dental Biochemistry	Lecturer
1982 Fall	Biochemistry Laboratory Rotation	Advisor
1982 Fall	Sophomore Periodontics	Lecturer
1982 Spring	Microbial Physiology	Lecturer
1981	Lipids in Membrane Function	Director
1981	Dental Biochemistry	Lecturer
1981	Growth and Development	Lecturer
1981	Sophomore Periodontics	Lecturer
1981	Postdoctoral Dental Biochemistry	Lecturer
1981	Table Clinic Elective	Advisor

#### The University of Texas Health Science Center at Houston

1980 - 1981	Biochemistry	Tutorial Leader
1980 - 1981	Research Tutorials	Research Advisor
1979 - 1981	Membrane Biochemistry	Lecturer
1975 - 1981	Pathology of Connective Tissues	Lecturer
1977 - 1981	Microbiology Laboratory	Lab. Instructor
1977 - 1981	Microbiology Laboratory	Section
	Cells and Tissues Module 3	Director
1977 - 1981	"Bacterial Genetics"	Section
	in Developmental Biology I Module	Director
1978- 1981	"Dental Calculus"	Section
	"Respiratory Infections"	Director
	"Cutaneous Infections" in Human Biology 15 Module	
1977 - 1980	Microbiology	Lecturer
1977 - 1980	Microbiology Laboratory	Lab. Instructor
1977 - 1979	Microbiology	Lecturer

#### Rice University, Houston

1973	Electron Microscopy	Lab. Instructor
1971	Physiology	Lab. Instructor
1972	Advanced Comparative Anatomy & Physiology	Lab. Instructor
1971	Genetics	Lab. Instructor
1970	General Biology	Lab. Instructor

#### **Clinical Teaching**

2005 – 2012	Co-Director, DMD/PhD Program in Dental Research MCG and Georgia Tech	
2005 – present	Pediatric Plastic Surgery Resident Research Rotation	Advisor
1995 - 2012	Orthopaedic Resident Research Rotation	Advisor
1987 - 1988	Sophomore/Junior/Senior for 4 students	Advisor
1986 - 1987	Junior/Senior Advisor for 4 students	Advisor
1985 - 1986	Freshman/Sophomore/Junior Advisor for 6 students	Advisor
1984 - 1985	Freshman/Sophomore Advisor for 4 students	Advisor
1983 - 1984	Freshman Advisor for 2 students	Advisor

#### **Instructional Development**

##### BME Abroad

New Course involving three weeks didactic instruction in international business issues related to biomedical engineering, followed by an internship in European company.

##### Formal Study to Improve Teaching Abilities

Education courses at Rice University, Houston, TX, 1968-1970.

Practice teaching in Biology, Rice University Houston, TX, summer, 1969, 1970

##### Current Research Concerning Teaching

Study on Laboratory Teaching Effectiveness in BMED 3160, Spring 2007 (with Essy Behravesh)

### Bibliography Concerning Teaching

Undergraduate Dental Biochemistry Curriculum Kit (with the Biochemistry Department)

### New Course Development

Revised Laboratory Manual for BMED 3160: Systems Physiology I – Cell Biology (2005)

Course Director: Special Topics in Biomedical Engineering Applications for Dentistry and Head and Neck Medicine (2005-present)

Development of self-directed curriculum in the Microbiology of Infectious Disease with special emphasis on Oral Infections (See: R.R. White, Journal of Dental Education, 1980).

## **IV. SCHOLARLY ACCOMPLISHMENTS**

### **A. Published Books and Parts of Books**

Ph.D. Dissertation: Boyan, Barbara Dale: Mineral Metabolism in Pulmonate Molluscs, Ph.D. Thesis, 1974.

Campbell JM, Boyan BD: On the acid-base balance of gastropod molluscs. In The Mechanisms of Mineralization in the Invertebrates and Plants, N Watabe, K Wilbur (eds), University of South Carolina Press, pp 109-134, 1976.

Boskey AL and Boyan BD, Editors: Proceedings of the 5th International Conference on the Chemistry and Biology of Mineralized Tissues. Kohler, Wisconsin, USA, October 22-27, 1995. Sessions II-VIII. Connect Tissue Res. 1996;35(1-4):1-417.

Boskey AL and Boyan BD, Editors: Proceedings of the 5th International Conference on the Chemistry and Biology of Mineralized Tissues. Kohler, Wisconsin, USA, October 22-27, 1995. Session I. Connect Tissue Res. 1996;34(4):239-92.

Boyan BD, Kinney RC, Singh K, Cillo Y, and Schwartz Z. Proteins and Other Bone Growth Factors. In Musculoskeletal Tissue Regeneration: Biological Materials and Methods. Ed: WS Pietrzak. Humana Press, March 7, 2008. Section II, 2008:11:225.

### **B. Refereed Publications**

1. Vogel J, Boyan-Salyers B: Acidic lipids associated with the local mechanism of calcification. A review. Clin Orthop Rel Res 118:230-241, 1976.
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7. Boyan-Salyers B, Vogel J, Riggan L, Summers F, Howell R: Application of a microbial model to biologic calcification. Metab Bone Dis Rel Res 1:143-147, 1978.
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11. Boyan-Salyers B, Boskey A: Relationship between proteolipid and Ca-phospholipid-phosphate complexes in microbiologic calcification. *Orthop Trans* 4:118, 1979.
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14. Boyan-Salyers BD: Proteolipid and calcification of cartilage. *Orthop Trans* 5:9, 1980.
15. Howell R, Boyan-Salyers B: Comparison of calcification between *Bacterionema matruchotii* and *Actinomyces naeslundii*. *J Dent Res* 59:1999-2005, 1980.
16. Boskey AL, Boyan-Salyers BD, Burstein LS, Mandel I: Lipids associated with mineralization of human submandibular gland sialoliths. *Arch Oral Biol* 26:779-785, 1981.
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21. Raggio C, Boskey A, Boyan B, Urist M: *In vivo* induction of hydroxyapatite formation by lipid macromolecules. *Orthop Trans*, 1983.
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35. Abbott JT, Heckman JD, Boyan BD, Carnes DL, Aufdemorte TB: Evaluation of the effect of bone morphogenetic protein on fracture nonunions. *Orthop Trans*, 1987.
36. Swain LD, Boyan BD: Ion-translocating properties of calcifiable proteolipids. *J Dent Res* 67(3):526-530, 1988.
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- in the mechanism of vitamin D regulation of chondrocyte cultures. *J Bone Miner Res* 6(7):709-718, 1991.
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Olivares-Navarrete R, Chaudhri R, Dard M, Wieland M, Boyan BD, Schwartz Z: SkDa component of enamel matrix derivative possesses osteogenic properties, Society For Biomaterials (SFB), Atlanta, Georgia, September 11-13, 2008.

Hurst-Kennedy J, Gupta V, Schwartz Z, Boyan BD: Lysophosphatidic acid enhances the viability of rat growth plate chondrocytes through the inhibition apoptosis and the promotion of cellular maturation, American Society for Bone and Mineral Research (ASBMR), Montreal, Canada, September 12-16, 2008.

Lazin JJ, Erdman CP, Chen J, Olivares-Navarrete R, Moyer HR, Guldberg RE, Baile C, Schwartz Z, Boyan BD: Enrichment of adipose-derived mesenchymal stem cells, American Society for Bone and Mineral Research (ASBMR), Montreal, Canada, September 12-16, 2008.

Lee CSD, Chen J, Wang Y, Guldberg RE, Williams JK, Schwartz Z, Boyan BD: Bone tether formation in femoral and basicranial growth plates have similar responses to growth disruptions due to nuclear vitamin D receptor genotype and mineral homeostasis, American Society for Bone and Mineral Research (ASBMR), Montreal, Canada, September 12-16, 2008.

Zhong M, Schwartz Z, Boyan BD: Phosphate induced apoptosis in growth plate chondrocytes via a nitric oxide and JNK-dependent pathway, American Society for Bone and Mineral Research (ASBMR), Montreal, Canada, September 12-16, 2008.

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- American Society for Bone and Mineral Research (ASBMR), Montreal, Canada, September 12-16, 2008.
- Chaudhri RA, Olivares-Navarrete R, Liou M, Schwartz Z, Boyan BD: A novel estrogen alpha variant signals rapidly from the caveolae of traditional ER alpha-negative cells, American Society for Bone and Mineral Research (ASBMR), Montreal, Canada, September 12-16, 2008.
- Hurst-Kennedy, J; Gupta, V; Boyan, BD, Schwartz, Z: 24R,25-dihydroxyvitamin D3 promotes maturation and cell survival in resting zone chondrocytes through lysophosphatidic acid signaling, Orthopaedic Research Society (ORS), Las Vegas, NV, February 21-27, 2009.
- Wang Y, Motta A, Lee CSD, Pelcastre L, Bella E, Migliaresi C, Schwartz Z, Boyan BD: Influence of pore size of silk fibroin scaffolds on chondrocyte differentiation in static and rotation culture conditions, Orthopaedic Research Society (ORS), Las Vegas, NV, February 21-27, 2009.
- Dosier C R, Lee CSD, Erdman C, Murphy M, Schwartz Z, Boyan BD, Guldberg RE, Barry F: Reduced surface expression of CD44, CD49b, CD49e, and CD105 associated with growth of human bone marrow stem cells is preserved during growth in osteogenic differentiation medium, Orthopaedic Research Society (ORS), Las Vegas, NV, February 21-27, 2009.
- Chen J, Wang Y, Olivares-Navarrete R, Chaudhri RA, Guo J, Hyzy S, Schwartz Z, Boyan BD: PDIA3 regulates osteoblast gene expression and bone matrix protein secretion through a 1,25D3-membrane-associated rapid response pathway, Orthopaedic Research Society (ORS), Las Vegas, NV, February 21-27, 2009.
- Chaudhri RA, Olivares-Navarrete R, Liou M, Camba JF, Boyan BD, Schwartz Z: Differential expression of estrogen receptor alpha splice variants in male and female osteoblasts, Orthopaedic Research Society (ORS), Las Vegas, NV, February 21-27, 2009.
- Denison, TD, Schwartz Z, Boyan BD: Fluid shear stress modifies gene expression in growth plate chondrocytes, Hilton Head Workshop, Hilton Head, SC, March 4-6, 2009.
- Vesper K, Olivares-Navarrete R, Dard M, Ranevski M, Wieland M, Boyan BD, Schwartz Z: N-Terminal of amelogenin induces osteogenesis and cementogenesis in hMSCs, International Association of Dental Research, Miami, FL, April 1-4, 2009.
- Hutton D, Olivares-Navarrete R, Hyzy S, Wieland M, Boyan BD, Schwartz Z: Donor age affects Osteoblast response to titanium microstructure and hydrophilicity, International Association of Dental Research, Miami, FL, April 1-4, 2009.
- Schwartz Z, Olivares-Navarrete R, Erdman CP, Wieland M, Cochran DL, Boyan BD: Microstructures Ti-surfaced directly and indirectly induce osteoblastic differentiation of MSCs, International Association of Dental Research, Miami, FL, April 1-4, 2009.
- Olivares-Navarrete R, Hyzy S, Hutton D, Wieland M, Boyan BD, Schwartz Z: Multiple wnt pathways differentially regulate osteoblast differentiation on microstructured titanium, International Association of Dental Research, Miami, FL, April 1-4, 2009.
- Boyan BD, Olivares-Navarrete R, Sutha K, Hutton D, Schwartz Z, McDevitt T: Nuclear and membrane VDRs regulate osteogenic differentiation of ESCs, International Association of Dental Research, Miami, FL, April 1-4, 2009.
- Wang Y, Motta A, Lee CSD, Pelcastre L, Bella E, Migliaresi C, Schwartz Z, Boyan BD: Generation of engineered cartilage using chondrocyte/silk fibroin scaffolds, Society For Biomaterials (SFB), San Antonio, TX, April 22-25, 2009.

Moyer HR, Wang Y, Farooque T, Singh K, Xie L, Guldberg RE, Williams JK, Boyan BD, Schwartz Z: Cartilage Regeneration in a Rat Critical-Size Xyphoid Cartilage Defect Model, Society For Biomaterials (SFB), San Antonio, TX, April 22-25, 2009.

Hurst-Kennedy, J; Gupta, V; Boyan, BD, Schwartz, Z: 24R,25-dihydroxyvitamin D3 Inhibits phosphate-induced apoptosis in the growth plate through LPA signaling and modulation of the tumor suppressor p53, American Society for Bone and Mineral Research (ASBMR), Denver, CO, September 11-15, 2009.

B.Y. Elbaradie K, Wang Y, Schwartz Z, Boyan BD: Gender-dependent rapid membrane responses of chondrocytes to dihydroxyestosterone, American Society for Bone and Mineral Research (ASBMR), Denver, CO, September 11-15, 2009.

Chen J, Wang Y, Olivares-Navarrete R, Herman TR, Chaudhri R, Hyzy S, Schwartz Z, Boyan BD:  $1\alpha,25$ -Dihydroxyvitamin D3 regulates osteoblasts via Pdia3-dependent rapid membrane signaling, American Society for Bone and Mineral Research (ASBMR), Denver, CO, September 11-15, 2009.

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Lee Christopher SD, Chen J, Guldberg RE, Schwartz Z, Boyan BD: Mineralized tether formation traversing the growth plate is regulated by vitamin D receptor mediated signaling, Vitamin D Workshop, Brugge, Belgium, October 4-8, 2009.

Chen J, Wang Y, Olivares-Navarrete R, Chaudhri RA, Schwartz Z, Boyan BD:  $1\alpha,25(\text{OH})_2\text{D}_3$  Regulates osteoblasts via PDIA3-dependent rapid membrane signaling, Vitamin D Workshop, Brugge, Belgium, October 4-8, 2009.

Wang Y, Lee Christopher SD, Nizkorodov A, Martin D, Hyzy S, Schwartz Z, Boyan BD: Isruption of PDIA3 gene results in embryonic lethality and bone adnormality in heterozygotes, Vitamin D Workshop, Brugge, Belgium, October 4-8, 2009.

Zhong M, Schwartz Z, Boyan BD: Estrogen induced chondrocyte apoptosis is via a mitochondrial pathway, American Association for Dental Research (AADR), Washington, DC, March 3-6, 2010.

Doroudi M, Wang Y, Schwartz Z, Boyan BD: Role of PLAA in  $1,25(\text{OH})_2\text{D}_3$ -Mediated membrane signaling in osteoblasts, American Association for Dental Research (AADR), Washington, DC, March 3-6, 2010.

Vesper K, Olivares-Navarrete R, Dard M, Mauth C, Ranevski R, Boyan BD, Schwartz Z: Synergistic effect of amelogenin N-terminus and hydroxyapatite increase osteoblast maturation, American Association for Dental Research (AADR), Washington, DC, March 3-6, 2010.

Olivares-Navarrete R, Hyzy S, Wieland M, Boyan BD, Schwartz Z: Dickkopf-1 and Dickkopf-2 play different roles in osteogenesis on microstructured titanium surfaces dependent on cell maturation state, American Association for Dental Research (AADR), Washington, DC, March 3-6, 2010.

Lee CSD, Burnsed O, Schwartz Z, Boyan BD: Short-term induction of microencapsulated adipose stem cells increases chondrogenic growth factor expression, 14th Annual Hilton Head Workshop, Hilton Head, SC, March 10-14, 2010.

Raines AL, Olivares-Navarrete R, Dard M, Schwartz Z, Boyan BD: Integrin mediated signaling regulates the angiogenic response of osteoblasts to titanium substrate features, 14th Annual Hilton Head Workshop, Hilton Head, SC, March 10-14, 2010.



Raines AL, Sunwoo MH, Thacker K, Guldberg RE, Boyan BD, and Schwartz Z: Angiogenesis in hyaluronan treated bone repair, Society For Biomaterials (SFB), Seattle, WA, April 21-24, 2010.

Hermann CD, Olivares-Navarrete R, Richards M, Guldberg RE, Skrinjar O, Williams JK, Schwartz Z, Boyan BD: The development of novel micro-computed tomography snake algorithm to determine time course of posterior frontal suture closure in mice, Society For Biomaterials (SFB), Seattle, WA, April 21-24, 2010.

Olivares-Navarrete R, Vesper K, Dard M, Mauth C, Ranevski R, Schwartz Z, Boyan BD: Amelogenin peptide (fraction C) induces osteogenesis and cementogenesis in hMSCs, Society For Biomaterials (SFB), Seattle, WA, April 21-24, 2010.

Olivares-Navarrete, R, Hyzy S, Dunn G, Pan Q, Dard MM, Appert C, Boyan BD Schwartz Z: Inhibition of noggin increases osteoblast maturation on microstructured titanium surfaces, Society For Biomaterials (SFB), Seattle, WA, April 21-24, 2010.

Olivares-Navarrete R, Hutton D, Dunn G, Hyzy S, Dard MM, Molenberg A, Boyan BD Schwartz Z: The Ca<sup>2+</sup>-dependent but not the canonical Wnt pathway enhances osteoblast maturation on titanium microstructured surfaces, Society For Biomaterials (SFB), Seattle, WA, April 21-24, 2010.

Hermann C, Myers M, Lennon F, Olivares-Navarrete R, Rhee W, Schwartz Z, Bao G, Boyan BD: Using molecular beacon probes to image  $\beta$ 1 integrin expression in live osteoblast-like cells, Society For Biomaterials (SFB), Seattle, WA, April 21-24, 2010.

Smith K, Hyzy S, Gall K, Schwartz Z, Boyan BD: Copolymer stiffness regulates the differentiation of MG63 pre-osteoblast cells, Society For Biomaterials (SFB), Seattle, WA, April 21-24, 2010.

Wang Y, Xie L, Moyer HR, Nizkorodov A, Hyzy S, Huang Y, Truncala K, Guldberg RE, Schwartz Z, Boyan BD: Cartilage regeneration in an immunocompromised rat critical-size xiphoid cartilage defect model, Society For Biomaterials (SFB), Seattle, WA, April 21-24, 2010.

Lee CSD, Moyer HR, Gittens RA, Williams JK, Schwartz Z, Boyan BD: In vivo Mineral Deposition in Unloaded Alginate Microbeads Is Similar to Hydroxyapatite Found in Bone and Can Be Eliminated with Buffered Crosslinking and Washing, Plastic Surgery Research Council, San Francisco, CA, May 22-26, 2010.

Lee CSD, Wang Y, Guldberg RE, Williams JK, Schwartz Z, Boyan BD: Tethers traversing the sphenoccipital synchondrosis increase with size and number with age and are regulated by vitamin-D receptor mediated signaling, Plastic Surgery Research Council, San Francisco, CA, May 22-26, 2010.

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Lee CSD, Chen J, Wang Y, Williams JK, Ranly DM, Schwartz Z, Boyan BD: Tethers affect sphenoccipital synchondrosis morphology via Vitamin-D receptor-mediated signaling, International Association of Dental Research, Barcelona Spain, July 14-17, 2010.

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Gittens R, McLachlan T, Cai Y, Tannenbaum R, Sandhage K, Dard M, Schwartz Z, Boyan BD: Increased nano-roughness created under controlled oxidative environments enhances osteoblast differentiation, International Association of Dental Research, Barcelona Spain, July 14-17, 2010.

Doroudi M, Schwartz Z, Boyan BD: Phospholipase A2 activating protein (PLAA) is required for  $1\alpha,25(\text{OH})_2\text{D}_3$ -induced rapid membrane response in osteoblasts, American Society for Bone and Mineral Research (ASBMR), Toronto Canada, October 8-12, 2010.

Elbaradie KBY, Wang Y, Boyan BD, Schwartz Z: Gender specific rapid membrane responses of rat costochondrocytes to  $17\beta$ -estradiol are estrogen receptor or dependent, American Society for Bone and Mineral Research (ASBMR), Toronto Canada, October 8-12, 2010.

Wang Y, Nizkorodov A, Riemenschneider K, Lee CSD, Martin D, Hyzy S, Schwartz Z, Boyan BD: Disruption of Pdia 3, a mediator of rapid membrane responses to  $1\alpha,25$ -Dihydroxy Vitamin D<sub>3</sub> results in embryonic lethality in homozygotes and bone abnormality in heterozygotes, American Society for Bone and Mineral Research (ASBMR), Toronto Canada, October 8-12, 2010.

Chaudhri RA, Cuenca N, Olivares-Navarrete R, Schwartz Z, Boyan BD: Membrane estrogen signaling via ER $\alpha$ 36 leads to crosstalk among pathways associated with cell survival and osseous metastases of breast cancer ID: A10005168, American Society for Bone and Mineral Research (ASBMR), Toronto Canada, October 8-12, 2010.

Chaudhri, RA, Cuenca N, Olivares-Navarrete R, Boyan BD, Schwartz Z: Membrane estrogen signaling leads to crosstalk among pathways associated with cell survival and bone metastasis of breast cancer, International Conference on the Chemistry and Biology of Mineralized Tissues (ICCBMT), Carefree, AZ, November 9-12, 2010.

Lee, Christopher SD, Chen J, Wang Y, Williams JK, Ranly DM, Schwartz Z, Boyan BD: Tethers are tightly linked to growth plate and synchondrosis morphologies in aged and VDR-null Mice, International Conference on the Chemistry and Biology of Mineralized Tissues (ICCBMT), Carefree, AZ, November 9-12, 2010.

Hyzy S, Olivares-Navarrete R, Pan Q, Dunn G, Dard MM, Boyan BD, Schwartz Z: Noggin inhibition increases osteoblast maturation on titanium microstructured surfaces, International Conference on the Chemistry and Biology of Mineralized Tissues (ICCBMT), Carefree, AZ, November 9-12, 2010.

Gittens RA, McLachlan T, Cai Y, Tannenbaum R, Sandhage K, Bemer S, Schwartz Z, Boyan BD: Increased nNano-scale roughness created under controlled oxidative environments enhances osteoblast differentiation, International Conference on the Chemistry and Biology of Mineralized Tissues (ICCBMT), Carefree, AZ, November 9-12, 2010.

Doroudi M, Wang Y, Boyan BD, Schwartz Z: Role of PLAA in  $1\alpha,25(\text{OH})_2\text{D}_3$ - induced rapid membrane response in both chondrocytes and osteoblasts, International Conference on the Chemistry and Biology of Mineralized Tissues (ICCBMT), Carefree, AZ, November 9-12, 2010.

Wang Y, Jiwani I, Schwartz Z, Boyan, BD: Growth plate chondrocyte responses to VitaminD3 metabolites in hypoxia, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Olivares-Navarrete R, Hyzy SL, Dunn GR, Boyan BD, Schwartz Z: Surface properties regulate BMP signaling in mesenchymal stem cells, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Park JH, Schwartz Z, Olivares-Navarrete R, Dard M, Boyan BD, Tannenbaum R: Influence of chemical modification on titanium microstructures surfaces on the osteoblast cell response, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Olivares-Navarrete R, Hutton DL, Hyzy SL, Boyan BD, Schwartz Z: Exogenous BMP2 increases pro-inflammatory cytokine production by osteoblasts on microtextured titanium, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Hermann C, Olivares-Navarrete R, Richards M, Guldberg RE, Skrinjar O, Williams J, Schwartz Z, Boyan BD: Novel micro-CT snake algorithm to determine bone fusion using computerized tomography, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Lee CS, Wang Y, Chen J, Nizkorodov A, Martin D, Guldberg RE, Schwartz Z, Boyan BD: Tethers are associated with growth plate morphology via 1 $\alpha$ ,25(OH) $_2$ D $_3$  signaling through VDR but not Pdia3, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Doroudi, M, Schwartz Z, Boyan BD: Role of PLAA in the 1 $\alpha$ ,25(OH) $_2$ D $_3$ -induced rapid membrane response in chondrocytes and osteoblasts, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Dosier CR, Ermdman CP, Schwartz Z, Boyan BD, Guldberg RE: Resveratrol effect on osteogenic differentiation of adipose derived stem cells is species dependent, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Sutha K, Olivares-Navarrete R, Guldberg RE, Schwartz Z, Boyan BD, McDevitt TC: Mineralization and osteoinductivity of mouse embryonic stem cell matrices, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Lee CS, Burnsed O, Schwartz Z, Boyan BD: Undifferentiated adipose stem cells secrete factors that inhibit chondrocyte phenotype and proliferation, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Hyzy SL, Olivares-Navarrete R, Basu R, Haithcock D, Boyan BD, Schwartz Z: Bone morphogenetic proteins induce osteoblast apoptosis in a maturation state-dependent manner, Orthopaedic Research Society (ORS), Long Beach, CA, January 13-15, 2011.

Olivares-Navarrete R, Hyzy SL, Park JH, Dunn GR, Haithcock D, Wasilewski C, Habersetzer P, Boyan BD, Schwartz Z: Wnt-integrin feedback mediates osteogenic-differentiation of HMSCs on microstructures-titanium surfaces, International Association for Dental Research (IADR), San Diego, CA, March 16-19, 2011.

Park JH, Schwartz Z, Olivares-Navarrete R, Dard M, Tannenbaum R, Boyan BD: Osteoblast differentiation on polyelectrolyte coated microstructured titanium surfaces, International Association for Dental Research (IADR), San Diego, CA, March 16-19, 2011.

Boyan BD, Olivares-Navarrete, Haithcock D, Hyzy SL, Mauth C, Berner S, Cochran D, Schwartz Z: Surface-energy and micron/sub-micron topography contribute separately to HMSC osteoblastic differentiation, International Association for Dental Research (IADR), San Diego, CA, March 16-19, 2011.

Gittens RA, Tannenbaum R, Olivares-Navarrete, Boyan BD, Schwartz Z: Direct current potentials applied to titanium surfaces stimulate osteoblast differentiation, International Association for Dental Research (IADR), San Diego, CA, March 16-19, 2011.

Boyan BD: Research in the Modern Healthcare Industry: Why Get Involved? The 2014 Inaugural Annual Conference of Emergering Healthcare Leaders, Richmond, VA, April 4-6, 2014.

## **E. Other Scholarly Accomplishments**

### Patents and Copyrights

#### **Issued US Patents**

- 9,373,584 Cranial suture snake algorithm
- 8,895,073 Hydrogel implant with superficial pores
- 8,486,436 Articular joint implant
- 8,445,006 Biomolecular coating for implants
- 8,318,192 Method of making load bearing hydrogel implants
- 8,202,701 Microencapsulation of cells in hydrogels using electrostatic potential
- 8,142,808 Method of treated joints with hydrogel implants
- 8,114,808 Biomolecular coating for implants
- 8,002,830 Surface directed cellular attachment
- 7,910,124 Load bearing biocompatible device
- 7,682,540 Method of making hydrogel implants
- 6,444,446 Calcium binding proteolipid compositions and methods
- 6,013,853 Continuous release polymeric implant carrier
- 6,001,352 Resurfacing cartilage defects with chondrocytes proliferated without differentiation using platelet derived growth factor
- 5,989,907 Methods and compositions for calcium binding proteolipid encoding nucleic acids
- 5,977,204 Biodegradable implant material comprising bioactive ceramic
- 5,876,452 Biodegradable implant
- 5,656,450 Activation of transforming growth factor beta by matrix vesicles
- 5,607,474 Multi-phase bioerodible implant/carrier and method of manufacturing and using same
- 5,492,697 Biodegradable implant for fracture nonunions
- 5,397,672 Resorbable materials based on independently gelling polymers of a single enantiomeric lactide
- 5,290,494 Process of making a resorbable implantation device

#### **Copyrights**

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#### **Foreign Patents**

Patent #667877: Multi-Phase Bioerodible Implant/Carrier and Method of Manufacturing and Using Same, Athanasiou and Boyan, 07/30/96 (Docket # and Country Code: 28-93 AU)

EP Patent #625891: Multi-Phase Bioerodible Implant/Carrier and Method of Manufacturing and Using Same, Athanasiou and Boyan (Docket # and Country Codes: 28-93 BE, CH, DE, FR, GB, HK, IT, JP)

## **V. SERVICE**

### **A. Professional Contributions**

#### Current Professional and Scientific Organizations

American Institute for Medical and Biological Engineering (AIMBE)  
 Biomedical Engineering Society (BMES)  
 Alpha Omega International Dental Fraternity  
 American Academy of Orthopaedic Surgeons (AAOS)  
 Orthopaedic Research Society (ORS)  
 American Association for the Advancement of Science (AAAS)  
 American Society for Bone and Mineral Research (ASBMR)  
 American Society for Matrix Biology (ASMB)  
 American Society for Testing and Materials (ASTM)  
 Biotechnology Industry Organization (BIO)  
 American Association for Dental Research (AADR)  
 International Association for Dental Research (IADR)  
     Implantology Group of IADR  
     Mineralized Tissue Research Group of IADR  
 International Conferences on the Chemistry and Biology of Mineralized Tissue  
 Organization for the Study of Sex Differences (OSSD) (Charter Member)  
 Tissue Engineering and Regenerative Medicine International Society (TERMIS)  
     North American Chapter  
 Society for Biomaterials (SFB)  
     Tissue Engineering Special Interest Group of SFB  
 Society for Women's Health Research  
 Leadership America Alumnae Association (Class of 1989)  
 Leadership Texas Alumnae Association (Class of 1988)

#### Past Professional and Scientific Organizations and Societies

Surfaces in Biomaterials Foundation  
 American Association of Oral Biologists (AAOB)  
 Biomineralization Society (Charter Member)  
 Implant Dentistry Research and Education Foundation (Charter Member)  
 Electron Microscopy Society of America  
 Central Texas Biotechnology Consortium  
 Forum on Entrepreneurship, San Antonio, TX  
 Greater Austin-San Antonio Corridor Council  
 Southwest Association of Biotechnology Companies  
 Technology Transfer Society  
 Texas Mineralized Tissue Society (Founder)  
 Texas Society for Electron Microscopy  
 Texas Technology Transfer Association (T<sup>3</sup>A)  
 Women's Faculty Association, University of Texas Health Science Center at San Antonio

#### **Past and Current Positions and/or Offices Held in Professional Organizations**

(\*Elected Offices)

American Academy of Orthopaedic Surgeons

- 2012-pres ORS Representative to Women's Health Initiatives Advisory Board  
 2010-pres Member, Working Group on Platelet Rich Plasma  
 2008-2010 Chair, Instructional Course on Sex and Gender Issues in Knee Osteoarthritis  
 2005-pres Chair, Combination Products Working Group, AAOS/OSMA/FDA Orthopaedic Device Forum  
 2004-2010 Member, Biological Implants Committee  
 2004-2005 Co-organizer, Use of Orthobiologics in Sports Medicine Symposium, 2005 AAOS Annual Meeting  
 2001-pres Member, New Technologies Working Group, Orthopaedic Device Forum  
 2001-2008 Consultant, Women's Health Issues Committee  
 2000-2003 Chair, Aging and Disability, Bone Structure and Function Panel, Task Force on Musculoskeletal Research  
 2000-2002 Member, Single-Use Forum Work Group, Orthopaedic Device Forum  
 1997-pres Orthopaedic Research Society Representative, Orthopaedic Device Forum  
 1997-2004 Member, Committee on Research  
 1997-2002 Chair, Animal Models Working Group, Orthopaedic Device Forum  
 1995 Co-chair, American Orthopaedic Association Consensus Workshop on Technology Transfer: Academic, Industry, and Federal Interactions in Developing and Applying New Technologies for Orthopaedics

#### American Association for Dental Research

- 2011-pres Member, Government Affairs Advisory Committee  
 2005-2012 \*Mineralized Tissue Group Councilor, AADR Council  
 1998 Workshop Chair, Industry Affairs Advisory Committee  
 1994-1997 Member, Publications Committee  
 1994-1995 Member, Gies Award Committee  
 1994-1995 Member, Local Arrangements Committee for 1995 Meeting  
 1993-1998 \*Member, Board of Directors (President, 1996-1997)  
 1993-1997 Member, National Affairs Committee  
 1988-1990 \*Chairman, Finance Committee, San Antonio Section  
 1988-1989 Chairman, Publications Committee  
 1987-1990 \*Member-at-Large, Publication Committee  
 1987-1989 Member, Ad Hoc Long Range Planning Committee  
 1985-1986 \*Member, Executive Committee, San Antonio Section  
 1984-1987 Member, Summer Student Fellowship Committee  
 1984-1985 \*President, San Antonio Section  
 1983-1984 Program Chairman, San Antonio Section

#### International Association for Dental Research

- 2005-2012 \*Councilor, Mineralized Tissue Group, IADR Council  
 1997-2000 Member, Biomineralization Award Committee (Chair, 2000)  
 1993 Member, Nominating Committee, Mineralized Tissue Group  
 1991-1992 Symposium Co-organizer, Mineralized Tissue Group  
 1990-1993 Member, Exhibits Committee  
 1988-1990 Chairman, Young Investigator Award Committee  
 1988-1989 \*President, Mineralized Tissue Group  
 1987-1990 Member, Gies Award Committee  
 1987-1988 Chairman, Appropriate Advertising Subcommittee  
 1987-1988 Member, Young Investigator Award Committee  
 1987-1988 \*Vice President and Symposium Chairman, Mineralized Tissue Group  
 1986-1987 \*Vice President-elect and Program Chairman, Mineralized Tissue Group  
 1985-1987 Chairman, Student Travel Award Committee, Mineralized Tissue Group  
 1985-1986 Symposium Organizer, Mineralized Tissue Group

#### American Association for the Advancement of Science

- 2011-2012 \*Chair-elect, Dentistry Division, AAAS

- 2005 Organizer, Tissue Engineering for the Head and Neck Symposium, AAAS Annual Meeting
- 2003-2008 AADR Representative, Section Committee of the AAAS Section on Biological Sciences (G)
- 2003-pres \*Executive Committee of the Dentistry Section (Chairman, 2004-2005)
- 1997-2006 AADR Representative, Medical Sciences Section Committee

#### Orthopaedic Research Society

- 2011-2014 Member, Basic Science Committee
- 2008 Workshop Co-chair, Osteoarthritis
- 2007 Workshop Co-chair, Use of Xenografts in Orthopaedics
- 2005 Workshop Co-chair, Sex and Gender Issues in Orthopaedics
- 2004-2005 \*Member, Nominating Committee
- 2000 Faculty, ORS/OREF/AAOS Grant Writing Workshop, January, 2000
- 1998 Workshop Chair, Animal Models for Use in Orthopaedics
- 1997-pres ORS Representative to the Orthopaedic Device Forum
- 1997-1998 Member, Finance Committee, 3<sup>rd</sup> Combined US/Japan/Canada Orthopaedic Research Society
- 1994-1997 \*Secretary, Board of Directors
- 1990-1991 \*Member, Board of Directors
- 1989-1990 Adjunct Program Review Committee
- 1988-1991 \*Member, Membership Committee (Chair, 1990-1991)

#### Society for Biomaterials

- 2006-2008 Member, International Scientific Program Committee for the 8th World Congress in Biomaterials, Amsterdam, 2008
- 1995 Co-chair, Biotechnology Special Interest Group Symposium
- 1994-1997 Member, Organizing Committee, Implant Retrieval Database Symposium
- 1994 \*Vice-chair, Biotechnology Special Interest Group

#### Surfaces in Biomaterials Foundation

- 2008-2010 Chair, Local Arrangements Committee, 2010 meeting in Atlanta
- 2007 Member, Musculoskeletal Research Network
- 2001 Member, Awards Committee
- 2000 Session Organizer
- 1995 Symposium Co-chair

#### International Conference on the Growth Plate

- 2005-2006 Member, Scientific Advisory Board, Second International Conference, Portland, OR
- 2001-pres Secretary, Board of Directors
- 2000-2001 Co-organizer, First International Conference, San Antonio, TX

#### American Society for Bone and Mineral Research

- 2008 Abstract Reviewer
- 2007 Abstract Reviewer
- 2005 Abstract Reviewer
- 2004 Abstract Reviewer
- 2003 Abstract Reviewer
- 2002 Abstract Reviewer
- 1996-1997 Member, Program Committee

#### ASTM

- 2000 –present Chair, Preclinical Assessments Subcommittee, F04 Committee on Tissue Engineered Medical Products

#### Society for Women's Health Research



2007-2012 Chair, 15-Person Task Force “Isis Fund for Sex Differences Research Network on Sex Differences in Musculoskeletal Health”

Organization for the Study of Sex Differences

2007-2009 \*Member, Council  
2007-2009 \*Member, Executive Committee

Texas Mineralized Tissue Society

2000 Organizer, 10<sup>th</sup> TMTS, Austin, TX  
1997 Co-organizer, 9<sup>th</sup> TMTS, Corpus Christi, TX  
1992 Organizer, 5<sup>th</sup> TMTS, Kerrville, TX  
1988-2002 President, TMTS Executive Committee

Texas Technology Transfer Association

1990-1992 Member, Scholarship Committee  
1990-1992 Member, Publication Committee  
1990-1991 \*Treasurer, Board of Directors  
1989-1990 \*Member-at-Large, Board of Directors  
1989-1990 Editor, T<sup>3</sup>A Newsletter

Tissue Engineering and Regenerative Medicine International Society

2007-2008 Member, Scientific Advisory Board, TERMIS, EU, 2008 Meeting, Porto, Portugal  
2006-2008 Member, Finance Committee, TERMIS-NA Council  
2006-2008 Member, Board of Directors, TERMIS-NA Council  
2005-2006 Member, Executive Committee, TESI Annual Meeting, Shanghai, China  
2004-2005 Member, Scientific Advisory Board, Regenerate, Atlanta, GA  
2003-2004 Member, Scientific Advisory Committee, Engineering Tissue Growth  
2003-2005 Member, International Scientific Committee  
2002-2004 Member, Steering Committee of the North American Chapter of TESI

Vitamin D Workshop

2005-2006 Member, Program Committee for 13<sup>th</sup> Workshop, Victoria, BC, Canada  
2002-2003 Member, Program Committee for 12<sup>th</sup> Workshop, Maastricht, The Netherlands

International Conferences on the Chemistry and Biology of Mineralized Tissue

2011-present President, Board of Directors, ICCBMT, Inc.  
2001-2010 Secretary, Board of Directors, ICCBMT, Inc.  
2004-2005 Member, Scientific Advisory Board, 8<sup>th</sup> International Conference  
2000-2001 Member, Scientific Advisory Board, 7<sup>th</sup> International Conference  
1996-1998 Member, Scientific Advisory Board, 6<sup>th</sup> International Conference  
1995 Guest Editor, Special Edition of Connective Tissue Research: “Proceedings of the Fifth International Conference on the Chemistry and Biology of Mineralized Tissues”  
1992-1996 Co-organizer, 5<sup>th</sup> International Conference, Kohler, WI, October 22-27  
1992 Member, International Scientific Committee, 4<sup>th</sup> International Conference  
1988-1992 Chairman, Finance Committee

**EDITORIAL BOARDS**

2015-present Member, Editorial Board, *Regenerative Engineering and Translational Medicine*  
2011-present Member, Editorial Board, *Journal of Biological Chemistry*  
2006-present Member, Editorial Board, *Journal of Tissue Engineering and Regenerative Medicine*  
2005-2006 Guest Co-Editor, *Dental Clinics of North America* Special Issue on Tissue Engineering in Dentistry  
2005-pres Member, Editorial Board, *Biochimica Biophysica Acta*  
2000-2005 Member, Board of Editors, e-biomed: *The Journal of Regenerative Medicine*  
1997-2002 Member, Editorial Board, *Journal of Oral Implantology*

- 1996-2006 Member, Editorial Board, *Biomaterials*  
 1996-pres Member, Editorial Board, *Journal of Biomedical Materials Research*  
 1995-pres Member, International Advisory Board, *Journal of Bone and Mineral Metabolism*,  
 Japan  
 1994-1998 Member, Senior Editorial Advisory Board, *Tissue Engineering*  
 1992-2002 Member, Editorial Committee, *Journal of Musculoskeletal Pain*  
 1991-1996 Member, Editorial Board, *Journal of Oral Implantology*  
 1991-1996 Member, Editorial Advisory Board, *Journal of Orthopaedic Research*  
 1989-2000 Member, Editorial Advisory Board, *Clinical Oral Implants Research*

#### **OTHER PROFESSIONAL ACTIVITIES**

- 2015-present External Advisory Board, Atlanta Clinical and Translational Science Institute,  
 Emory University Medical School, Atlanta, GA  
 2014-2020 Member, Biomedical Materials and Bio-imaging Study Section (BMBI), National  
 Institutes of Health, Bethesda, MD  
 2008-2012 Chair, Roundtable on Biomedical Engineering Materials and Applications, National  
 Materials Advisory Board, The National Academies, Washington, DC  
 2008-present Alternate, Scientific Review Board, California Institute of Regenerative Medicine,  
 San Francisco, CA  
 2008-2011 Member, Scientific Review Board, Arthritis Foundation, Atlanta  
 2007-2008 Member, Scientific Review Board, Ohio Advanced Technology Program  
 2007-2008 Member, National Research Council Panel on Chemical Science and Technology,  
 National Institute of Standards and Technology  
 2006-2007 Member Program Committee, Arthritis Foundation Annual Symposium, Atlanta  
 2005-present Member, External Advisory Board, Regenerative Medicine Institute (REMEDI),  
 Galway, Ireland  
 2005 Review Panel, Emtech Bio Seed Grant Program, Emtech Bio, Atlanta, GA  
 2005-2013 Member, Eminent Scholars Advisory Group, Georgia Research Alliance  
 2005 Reviewer, National Academy of Sciences National Research Council Report,  
 "Analyzing Information on Women-Owned Small Businesses in Federal  
 Contracting"  
 2003-2008 Member, National Materials Advisory Board, National Research Council of the  
 National Academies  
 2003-2010 Member, External Advisory Board, Program Project on Osteocytes (Lynda  
 Bonewald, PI), University of Missouri at Kansas City  
 2003 Member, Advanced Biomaterials R01 Review Panel, NIH  
 2003-2009 Member, Medical and Scientific Advisory Council, Arthritis Foundation  
 2003 Member, Search Committee for Investigators with Research Interest in Bone Cell  
 Biology, Emory University Division of Endocrinology.  
 2002-2004 Member, External Advisory Board, Comprehensive Training Program in Oral  
 Biology, David  
 Eich, PI, University of Missouri at Kansas City  
 2002-pres External Advisory Board, Comprehensive Training Program in Oral Biology, John  
 Keller, PI, University of Iowa.  
 2002-2003 Faculty Member, Symposium on Musculoskeletal Allograft Tissue: Safety and  
 Efficacy, at the 2003 Annual Meeting of the AAOS, New Orleans, LA, February 9,  
 2003  
 2002 Public Hearing FDA Regulation of Combination Products, Testimony on Behalf of  
 the AAOS  
 2002 Member, Special Review Committee for Osteoarthritis SCOR Applications, National  
 Institute of Arthritis & Musculoskeletal & Skin Diseases, Washington, D.C., April,  
 2002  
 2002 Member, FDA Advisory Board on BMP-2 Implant for Spine  
 2001 Scientific Reviewer, Scientific Peer Review with the Fiscal Year 2001  
 Neurofibromatosis Research Program (NFRP, Department of Defense (DOD)),

- U.S. Army Medical Research and Materiel Command (USAMRMC),  
 Congressionally Directed Medical Research Programs (CDMRP)
- 2001-2002 Member, Internal Advisory Committee, San Antonio Center for Research to Reduce  
 Oral Health Disparities (SACRROHD)
- 2000-2001 Member, U.S. Clinical Advisory Board, Spine Solutions, Inc.
- 2000 Breakout Session Leader, "Orthopaedic Biomaterials," One-Day Workshop on  
 Reference Data on Properties of Biomaterials, National Institute of Standards and  
 Technology, July, 2000
- 2000 Faculty, "Status of Products for Bone Replacement and Repair that Contain  
 Biological Materials," Tissue Engineering in Bone, FDA Staff College, February,  
 2000, Rockville, MD
- 2000 Faculty Member, MacArthur Cartilage Repair Workshop, Hospital for Special  
 Surgery, New York, NY, May 13, 2000
- 2000 Presenter, "Biological Questions in Implant Wear," Wear 2000 Workshop, American  
 Academy of Orthopaedic Surgeons and the National Institutes of Health, Oak  
 Brook, IL, October 20-22
- 2000 Session Chair, Cell Surface Interactions Session, Surfaces in Biomaterials 2000  
 Symposium, Miami, FL
- 1999-2004 Member, Orthopaedic Education and Research Foundation Peer Review Committee,  
 Research Grant Applications, Rosemont, IL
- 1999 Session Chair, Biomedical Engineering Society, Biomaterials and Cellular Response,  
 Chicago, IL, October 15, 1999
- 1999 Faculty Participant, Inaugural Symposium, "Minimally Invasive Technologies:  
 Medicine in the 21<sup>st</sup> Century," Presbyterian Institute for Minimally Invasive  
 Technology, May 14-15, 1999
- 1999 Chairperson, Telephone Conference for K01 Awards, National Institute of Arthritis  
 Musculoskeletal and Skin Diseases, May 7, 1999
- 1999 Ad hoc reviewer, Musculoskeletal and Dental Review Group, General Medicine B  
 Study Section, NIH, Bethesda, MD, June, 1999
- 1999 Member, Special Emphasis Panel, National Institute of Dental and Craniofacial  
 Research, May, 1999
- 1998-2002 Reviewer, McArthur-Cartilage Award grants, Hospital for Special Surgery, The New  
 York Hospital and Cornell University Medical College
- 1999 Faculty, ORS/OREF/AAOS Grant Writing Workshop, "Budgets/justification,"  
 American Association of Orthopaedic Surgeons, Rosemont, IL, January 1999
- 1998-2002 Grantee Officer, National Institute of Arthritis and Musculoskeletal and Skin  
 Diseases Institutional Study Section, National Institutes of Health
- 1998-2002 Member, Arthritis and Musculoskeletal and Skin Diseases Review Committee,  
 National Institute of Arthritis and Musculoskeletal and Skin Diseases
- 1998-2001 Chairman, Orthopaedic and Rehabilitation Devices Panel, Medical Devices  
 Advisory Committee, Food and Drug Administration
- 1998 Moderator, "Differentiation of Mesenchymal Cells, Part 2," Session V, Sixth  
 International Conference on the Chemistry and Biology of Mineralized Tissues,  
 Vittel, France, November, 1998
- 1998 Organizer, "Animal Models for Establishing Safety and Effectiveness of Biologic  
 Devices for Use in Orthopaedics," Educational Program/Workshop, 44th Annual  
 Meeting of the Orthopaedic Research Society
- 1998 Organizer, Workshop on Issues Related to FDA Approval of Materials/Devices,  
 Orthopaedic Research Society 1998 Annual Meeting, New Orleans, LA
- 1998 Session Chair, Society for Biomaterials
- 1997-2001 Member, Department of Veterans Affairs (VA) Merit Review Subcommittee for  
 Surgery
- 1997 Member, Oral Health Working Group, "Beyond Hunt Valley: Research on Women's  
 Health for the 21st Century," Office of Research on Women's Health, National  
 Institutes of Health
- 1997 Consultant, Spine Tech, Inc., Minneapolis, MN

- 1997 Chair, Bone Session, Gordon Research Conferences on Periodontal Diseases, New England College, NH
- 1997 Moderator, Spine Fusion Session, Orthopaedic Research Society 1997 Annual Meeting, San Francisco, CA
- 1997 Member, Organizing Committee, Dentistry Subgroup, NIH Women's Health Initiative Conference, Bethesda, MD
- 1997 Organizer, "Funding - Non-National Institutes of Health," Educational Program/Workshop, Orthopaedic Research Society Annual Meeting, San Francisco, CA
- 1997 Panelist/discussant, "Protecting Your Orthopedic Invention," Orthopaedic Research Society Plenary Session
- 1996-2001 Member, Orthopaedic Device Panel, FDA
- 1996-2000 Member, Board of Advisors, Institute for Spine & Biomedical Research, Dallas, TX
- 1996 Participant, "A New Beginning: Changing Relationships Between Universities and Industry," Texas Technology Transfer Association Annual Conference, October 2-4, 1996, Conroe, TX
- 1996 Participant, "Biomimetics, Tissue Engineering, and Biomaterials," National Institute for Dental Research Workshop, September 24-26, 1996, Rockville, MD
- 1996 Member, Program Committee, Bone Cartilage and Connective Tissue Matrix Category, 1996 Annual Meeting, American Society for Bone and Mineral Research, Seattle, OR
- 1996 Moderator, Spine Fusion Session, 42nd Annual Meeting, Orthopaedic Research Society, Atlanta, GA
- 1995 Consultant, Orthopedic and Rehabilitation Devices Panel, Center for Devices and Radiological Health, Food and Drug Administration
- 1995 Session Chair, "Matrix Proteins/Integrins," American Society for Bone and Mineral Research Annual Meeting, Baltimore, MD
- 1995 Session Chair, "Biologic Responses to Wear Debris," American Academy of Orthopaedic Surgeons Workshop on Wear Debris
- 1995 Session IX Chairman, "Bone Cell Phenotypes in Host Responses," Gordon Conference on Periodontal Diseases
- 1994-1999 Consultant and Chair, Scientific Advisory Board, OsteoBiologics, Inc.
- 1994-1996 Member, Scientific Advisory Board, Implant Dentistry Research and Education Foundation
- 1994-1995 Co-chair, International Symposium on Cartilage Metabolism, Osaka, Japan
- 1994 Member, Organizing Committee of the International Conference on Bone Morphogenetic Proteins in Honor of Marshall Urist
- 1994 Panelist, "Symposium - The Reviewers' Perspective," Writing Winning Grants by Avoiding Common Pitfalls Workshop, University of Texas Health Science Center at San Antonio
- 1994 Panelist/discussant, "Protecting Your Orthopedic Invention," Orthopaedic Research Society Plenary Session
- 1994 Ad Hoc Member, Orthopaedic and Musculoskeletal Diseases Study Section, National Institutes of Health
- 1993 Consultant, Biomaterials Initiative, Columbia University
- 1993 Moderator, "Technology Transfer," S/IUCRC Directors' Meeting, National Science Foundation
- 1992-1993 Member, Planning Committee, S/IUCRC Directors' Meeting, National Science Foundation
- 1992 Consultant, Review of Skeletal Technologies, Inc., Primus Venture Partners, Cleveland, OH
- 1992 Participant, Government-University-Industry Research Roundtable, Intellectual Property Rights in University-Industry Research Agreements Workshop, Whitaker Foundation
- 1992 Presenter, "Writing Industry Grants," Dentist/Scientist Program Industry Grant Writing Workshop, University of Texas Health Science Center at San Antonio
- 1992 Chairman, National Institutes of Health Special Study Section

- 1992 Invited participant, Vision 2020, San Antonio, TX
- 1992 Co-sponsor, Forum on Entrepreneurship, San Antonio
- 1992 Panel Discussion Moderator, "Research Collaborations with Industry," Building Collaborations in Research and Training, University of Texas at San Antonio
- 1992 Co-sponsor and presenter, Business Plan Development Conference/Workshop, Industry University Cooperative Research Center, University of Texas Health Science Center at San Antonio
- 1991-1992 Presenter, Associate Editor of Proceedings, Organizing Committee, NIH Workshop on Osteoporosis and Oral Bone Loss, Landsdowne, Virginia
- 1991-1995 Member, Technology Review Board, Technology Transfer Team of San Antonio
- 1991 Consultant, Improving the Dental Research Program in Veterans Health Services and Research Administration, Washington, D.C.
- 1991 Participant, Dental Research Programs Advisory Committee, Minority Oral Health Issues, National Institute for Dental Research
- 1991 Chairman, Industry/University/Government Interactions: Models for the Future, National Institute for Dental Research-sponsored Conference at Forsythe Dental Center and Harvard University in honor of Jack Hein
- 1991 Chairman, Study Section, "Gordon Conference on Calcium Phosphates," National Institute for Dental Research
- 1991 Consultant, Training of Women and Minorities, Testimony to Program Advisory Committee, National Institute for Dental Research
- 1991-1992 Member, Planning Committee, "Biological, Material and Mechanical Considerations of Joint Replacement: Current Concepts and Future Directions," Bristol Meyers Squibb Zimmer Orthopaedic Research Symposium, San Antonio, TX
- 1990 Reviewer, Grant Review Committee, National Osteoporosis Foundation
- 1990-1991 Member, Executive Committee and Chairman, Young Investigator Awards, Fifth International Conference, Cell Mediated Calcification and Matrix Vesicles, Hilton Head, SC
- 1989 Ad Hoc Consultant, Board of Scientific Counselors, Intramural Research Program, National Institutes for Dental Research
- 1989-1990 Chairman, Ad Hoc Long Range Planning Committee, Academia/National Institutes for Dental Research/Industry Section, National Institutes for Dental Research
- 1989-1993 Member, Orthopaedic and Musculoskeletal Diseases Study Section, National Institutes of Health
- 1989-pres Reviewer, Implantology Foundation Research Grants
- 1988-1990 Chairman, North American Fellowship Committee, Alpha Omega Foundation
- 1988-1990 Member, Editorial Advisory Board, *Windows*, Texas A & M Technology Transfer Journal
- 1988 Member, Editorial Advisory Board, *Clinical Orthopaedics and Related Research*
- 1988-1994 Member, Scientific Review Board, Applied Technology Program, Louisiana Education Quality Support Fund, Board of Regents of the State of Louisiana
- 1988-1992 Reviewer, Veterans Administration Research Grants
- 1988-1989 Chairman, Ad hoc Long Range Planning Committee, Mineralized Tissues and Craniofacial Anomalies Section, National Institute for Dental Research
- 1987-pres Reviewer, *Journal of Orthopaedic Research*
- 1987-pres Ad hoc Grant Reviewer, Medical Research Council of Canada
- 1987-pres March of Dimes Foundation, Grant Reviewer
- 1987-1988 Member, Scientific Advisory Board, Texas Research Park
- 1987-1988 Member, NIDR Committee to Study Training Grants
- 1987 Chairman, Oral Biology and Medicine Study Section, AHR-2 for SBIR proposals
- 1987 Member of Program Project Site Visit Team, Diabetes Study Section
- 1987 Chairman and Organizer, AAAS Symposium on Calcium Metabolism, Austin, Texas, April
- 1987-1988 Chairman and Organizer, "Bioactive Factors in Bone Development and Repair", Kerrville, Texas, 1988
- 1986-1995 Media Spokesperson, American Dental Association
- 1986-1995 Media Spokesperson, American Association for Dental Research

- 1985-1988 Executive Committee Member, Third International Conference on Chemistry of Mineralized Tissues, Chatham Bars, MA 1988
- 1985-1987 Board of Directors, San Antonio Bone Bank Foundation
- 1985 Session Chairman, International Association for Dental Research
- 1985 Session Chairman, "Mineral Transport across Cells," Gordon Research Conference on Bones and Teeth
- 1984-pres Reviewer, *Journal of Biological Chemistry*
- 1984-1987 Co-Founder and Scientific Consultant, Biomedical Development Corporation
- 1984-1985 Member, Consultant Panel on the Center Grant Program, National Institute for Dental Research
- 1984 Session Chairman, American Association for Dental Research
- 1983 Session Chairman, American Association for Dental Research
- 1983 Coordinator, "Matrix Vesicles: Structure and Functions," Pre-American Society for Bone and Mineral Research Workshop, San Antonio, June, 1983
- 1982-2001 Advisor, Alpha Omega International Dental Fraternity, San Antonio Chapter
- 1982-pres Reviewer, *The American Journal of Pathology*
- 1981 Session Chairman, Mineralized Tissue Group Section, American Association for Dental Research
- 1980-pres Consultant, Intramural Review Board, National Institute for Dental Research
- 1980-pres Reviewer, *Clinical Orthopaedics and Related Research*
- 1980-pres Reviewer, *Bone (formerly Metabolic Bone Disease and Related Research)*
- 1980-1987 Consultant, Alternate, June, 1982; Consultant, Alternate, June, 1983; Consultant, October, 1983; Consultant, Alternate, February, 1984; Member, June 1984 to June 1987; National Institutes of Health, Oral Biology and Medicine Study Section
- 1980-1981 Coordinator, Houston Area Calcium Metabolism Society
- 1980-1981 Reviewer, National Institutes of Health-National Institute for Dental Research, Goals and Objectives Panel, Mineralization Component of the Soft Tissue, Stomatology and Nutrition Program Branch
- 1980 Session Co-Chairman, American Association for Dental Research
- 1975-pres Reviewer, *Journal of Dental Research*
- 1975-1977 Abstractor, American Dental Association

## **B. Campus Contributions**

- 2007-2008 Chair, Subcommittee on Technology Transfer Issues
- 2007-2008 Member, Provost's Strategic Planning Initiative
- 2007-pres Member, Strategic Planning Committee, IBB
- 2006-2010 Member, Executive Committee, Cancer Center for Nanotechnology Excellence
- 2006-2007 Chair, Vaccine Technology Working Group, College of Engineering
- 2006 Invited Participant, Spring Midnight Breakfast, Georgia Institute of Technology, Atlanta, GA, April 2006, Fall 2006
- 2005-pres Member, Corporate Research Leaders Forum, Georgia Biomedical Partnership
- 2005-2007 Member, Strategic Planning Committee, BME
- 2005-pres Director, Laboratory for Craniofacial Plastic Surgery Research, Children's Healthcare of Atlanta
- 2005-2006 Member, Cell Biology Search Committee, Biology
- 2005-2006 Member, Faculty Advisory Committee, BME
- 2005 Member, Strategic Planning Task Force for the Georgia Tech Physiology Research Laboratory
- 2005 Member, Sigma Xi Graduate Student Thesis Award Committee
- 2004-2007 Member, Search Committee for New GTRI Laboratory Director
- 2004-2008 Chair, BME Reappointment, Promotion and Tenure Committee
- 2004-2006 Member, College of Engineering Reappointment, Promotion and Tenure Committee
- 2004 Panelist, ADVANCE-WST Career Planning/Strategizing Panel October
- 2002-2008 Deputy Director for Research, Georgia Tech/Emory Center for the Engineering of Living Tissues
- 2002-pres Member, Steering Committee, Institute of Bioengineering and Biosciences

- 2002-pres Member, Graduate Program Committee, BME  
 2002-2004 Member, Bioengineering Graduate Program Committee, BME  
 2002-2003 Member, Executive Advisory Committee, BME  
 2000-2002 Member, Georgia Tech / Emory Center for the Engineering of Living Tissues,  
 External Advisory Board, Atlanta, GA

### C. Other Contributions

#### **The University of Texas Health Science Center at San Antonio**

##### University

- 2001 Member, Ad Hoc Committee-instrumentation Services, Educational Research and Instrumentation Advisory Committee  
 1998 Member, Ad Hoc Committee for Intellectual Properties/Technology Transfer  
 1998 Member, Search Committee, Chairman of Anesthesiology  
 1997-2001 Chair, Tissue Engineering Task Force, COHRCD  
 1997-1998 Ad Hoc Member, Institutional Strategic Research Planning Committee  
 1997-1998 Member, Subcommittee on Future Trends in Interdisciplinary Research, Accreditation Committee  
 1993-1994 Faculty Advisor, S.H.A.R.E. Committee, Office of Student Services Substance Abuse Task Force  
 1992-2001 Representative, Microelectronics and Computing Technology Corporation (MCC), Associates Program  
 1991-pres Member, Conflict of Interest Committee  
 1987-1988 Member, PET Committee  
 1986-1991 Chairman, Industry-University Cooperative Research Center Industry Advisory Board  
 1985-1987 Member, President's Task Force on an Institutional Travel Desk  
 1984 Member, Ad Hoc Committee for Center for Aging Research  
 1982-1984 Chairman, Health Science Center Women's Faculty Group Umbrella Committee  
 1981-1988 Member, Institutional Research Grants Committee  
 1979-1981 Member, Subcommittee on Academic and Behavioral Standards

##### Medical School

- 1996-2002 Member, Executive Committee, Howard Hughes Medical Institute Program  
 1995 Member, Ad Hoc Committee for Focus on Research, Medical School Self Study for Liaison Committee for Medical Education (LCME)  
 1994 Member, Ad Hoc Committee for the Medical School Self Evaluation [Americans with Disabilities Act (ADA)]  
 1991-1996 Chairman, Department of Orthopaedics, Promotion and Tenure Committee  
 1988-1992 Chairman, Department of Orthopaedics, Animal Use Committee

##### Dental School

- 2001-2004 Member, Dental School Faculty Development Committee  
 2000-2002 Member, Principal Committee on Research (Subcommittee), Accreditation Steering Committee  
 1997-2002 Chair, Executive Committee, Dental Materials Program Project  
 1997-2002 Member, Executive Committee, Comprehensive Oral Health Research Centers of Discovery Proposal  
 1994-1995 Member, Steering Committee, Dental School's 25th Anniversary International Symposium  
 1993-1994 Member, Search Committee for Biomaterials, Dept. of Restorative Dentistry  
 1986-1987 Member, DSRDP Committee (Practice Plan), Department of Periodontics  
 1983-1987 Chairman, Financial Planning Committee, Department of Periodontics  
 1985-1986 Chairman, Intramural Research Seminar, Department of Periodontics  
 1981-1983 Director, EM Facility, Department of Periodontics  
 1993-1994 Member, Task Force on Tenure and Appointments, Dental School  
 1988-1989 Member, Ad hoc Committee on Biomaterials, Dental School

- 1988-2001 Member, Ad hoc Dean's Advisory Committee on Research, Dental School  
 1988-1989 Member, Accreditation Sub Committee on Research, Dental School  
 1985-1987 Chairman, Dental Research Committee  
 1984-1988 Member, NIH Summer Dental Student Training Grant Committee  
 1983 Member, Dental Student-Faculty Relations Committee - Curriculum Subcommittee  
 1982-1986 Executive Committee, Women's Faculty of the Dental, Graduate and Medical Schools; Member, Corresponding Secretary; Chairman, Professional Development Committee  
 1981-1984 Coordinator (Drs. Leinfelder, Schachtele, Sela), Distinguished Dental Scholars Lecture Series  
 1981-1982 Ex-officio Member, Dental Research Committee  
 1981 Chairman, Ad Hoc Dental School Space Allocation Advisory Committee  
 1979-1981 Secretary, Dental Postgraduate\Graduate Faculty Advisory Committee  
 1978-1979 Member, Dental Postgraduate\Graduate Faculty Advisory Committee

### **University of Texas Health Sciences Center at San Antonio**

#### Administrative Responsibilities

##### Department

- 2001-2002 Vice Chair for Research, Orthopaedics  
 2000-2002 Chairman, Promotion and Tenure Committee, Orthopaedics  
 1990-1996 Chairman, Promotions and Tenure Committee, Orthopaedics  
 1988-2002 Director, Division of Orthopaedic Research  
 1988-2002 Coordinator, Mineralized Tissue Group Journal Club  
 1985-1988 Coordinator, Periodontics Intramural Seminar  
 1984-1988 Director, Periodontics Tissue Culture Facility  
 1983-1986 Chairman, Financial Planning Committee, Periodontics  
 1981-1984 Coordinator, Periodontics Research Seminar  
 1982-1984 Coordinator, Periodontics Research Journal Club  
 1982-1983 Coordinator, Table Clinic Presentations

##### Dental School

- 1985-1987 Chairman, Dental School Research Committee  
 1986 Provisional Director, Research Center for Oral Biology (1/1/86-7/1/86)  
 1984-1985 President, San Antonio Section/American Association for Dental Research  
 1981-1984 Supervisor, Electron Microscopy Laboratory, UTHSCSA Dental School  
 1976-1981 Supervisor, Electron Microscopy Laboratory, Dental Science Institute, Houston  
 1976-1981 Executive Advisory Committee, Dental Science Institute, Houston

##### University

- 1992-2001 Director, Center for the Enhancement of the Biology/Biomaterials Interface at San Antonio  
 1986-2001 Director, Industry/University Cooperative Research Center

### **The University of Texas Health Science Center at Houston**

#### Graduate School of Biomedical Sciences

- 1979-1981 Member, Academic Standards Committee (GSBS)

##### Dental School

- 1979-1980 Member, Ad Hoc Human Biology Review Committee  
 1978-1981 Member, Committee on Research, Dental Branch  
 1977-1981 Member, Developmental Biology Topic Committee, Dental Branch  
 1979-1981 Chairman, Subcommittee on Graduate\Postgraduate Curriculum  
 1976-1978 Member, Executive Review Committee, Dental Science Institute

### **Other Activities**



- 2005 Invited Speaker, "Does Genetic Sex Matter? Implications for Cell and Tissue Engineering", Georgia Biomedical Partnership, Atlanta, GA, August 24, 2005
- 2004-2005 Atlanta Task Force on Combination Products, Medical Technology Leadership Forum
- 2002 Faculty, Emory University Mini Medical School
- 2000 Session Program Leader, "Why Are Boys Taller than Girls?", Northside ISD Gifted and Talented Program, October 30, 2000, San Antonio, TX
- 1998 Invited Speaker, "Biochemistry of Calcification," NIH Conference, New Initiatives in Ankylosing Spondylitis Research, Bethesda, MD.
- 1998 Invited Speaker, "Biomedical Technology in the Austin-San Antonio 'Intellectual' Corridor," Technology Alliance of San Antonio, March, 1998.
- 1998 Member, School-Business-Community Partnership Council, Northside Independent School District, San Antonio, Texas
- 1994-1996 Member, Imagineer Awards Committee, Mind Science Foundation, San Antonio, Texas
- 1994-2000 Member, School Advisory Team, Holmgreen Junior/Senior High School, San Antonio, TX
- 1993-2000 Mentor, Holmgreen Junior/Senior High School, San Antonio, Texas
- 1993-2000 Member, San Antonio Health Care Task Force, City of San Antonio
- 1993 Member, Records Management Preservation Advisory Committee, Government Technology Conference, Austin, Texas, February 10-12
- 1992 Invited speaker, "Mechanistic Aspects of Calculus Formation and Control," American Association for Dental Research
- 1992 Member, Vision 20/20 Task Force, City of San Antonio
- 1992 Chair, "Biotechnology: Miracle Workers and the New Wildcatters Explore the Last Frontier," Leadership America, Houston Symposium
- 1991-1992 Member, Advisory Board, Quatros Caminos, Greater San Antonio-Greater Austin Corridor Council
- 1991 Co-chairman, Athenaeum, Leadership Texas Alumnae Association
- 1989-1990 Elected San Antonio Regional Representative, Alumnae Board, Leadership Texas
- 1989 Selected to "Leadership America" supported by the Foundation for Women's Resources, Washington, D.C.
- 1988 Selected to "Leadership Texas" supported by the Texas Foundation for Women's Resources, Governor's Office, Austin, Texas
- 1988 Member, Economic Development/Business Formation, Committee of the Technology Industry Legislative Task Force (TILT)
- 1987-pres Elected to membership in the San Antonio 100
- 1987-1988 Member, Board of Directors, Volunteer Department, Bexar County Hospital District
- 1987-1988 Treasurer, The University of Texas Health Science Center Club
- 1987-1988 Member, Scientific Advisory Board, Texas Research Park
- 1986 Witness, Texas Legislature on the role of Texas government in fostering biotechnology
- 1985 Speaker, Women's Fair Forum, Mayor's Commission on the Status of Women, San Antonio, Texas
- 1985 Scientific Expert on Biochemistry of Fluoride, City Council, San Antonio, Texas
- 1985 Invited Speaker, Texas Women's Resources, "Technology Spectrum: Opportunities for Women," Dallas, Texas
- 1984 Speaker, Women in the 80's Symposium, Mayor's Commission on the Status of Women, San Antonio, Texas
- 1984 UTHSCSA Representative to local organizations for the Permanent University Fund
- 1983-2002 Member, Women's Faculty Association of the Dental, Graduate and Medical Schools Executive Committee; Chairman, Health Science Center Umbrella Committee (1983-1985); Corresponding Secretary (1983-1985); Chairman, Professional Development Committee (1985-1986)
- 1983 Judge, Northside School District Science Fair
- 1982-2002 Advisor, Alpha Omega International Dental Fraternity, San Antonio Chapter
- 1982-1984 UTHSCSA Representative, Ed White Middle School Career Day

## Invited Lectures

- Invited Speaker, 10th Annual Army Force Health Protection Conference, August 5-10, 2007.
- Invited Speaker, Arthritis Research Conference, Stone Mountain, GA, April 2007.
- Invited Speaker, "Biological Basis for SLActive", ITI Brazil Congress; Sao Paulo, Brazil, September 2006.
- Invited Speaker, "Substrate Micron Scale and Submicron Scale Structural Features Affect Cell Behavior", Galway, Ireland, July 2006.
- Invited Speaker, "Hormonal Regulation of Chondrocyte Maturation and Mineralization", Second International Conference on the Growth Plate, Portland, OR, June, 2006.
- Invited Speaker, "Extremity War Injuries: Current, State of the Art, and Future Directions", Washington, DC, January, 2006.
- Invited Speaker, "What's Exciting in Biomedical Engineering", Department of Chemistry, Spelman College, Atlanta, GA, October 2005.
- Invited Faculty, American College of Spine Surgeons Annual Meeting, Riverside, CA, July, 2005.
- Invited Speaker, ITI Annual Meeting, Munich, Germany, June, 2005.
- Invited Speaker, "Fourth International Meeting on Rapid Responses to Steroid Hormones," San Diego, CA, June, 2005.
- Invited Speaker, Second Annual Workshop, "Flavonoid Compounds for the Prevention of Osteoporosis", Georgia Center for Continuing Education, Athens, GA, May 19, 2005.
- Invited Speaker, "Biomedical Engineering Seminar Series", Mayo Clinic College of Medicine, Rochester, Minnesota, May, 2005.
- Invited Speaker, "Role of Novel Membrane-Associated Steroid Hormone Receptors in Bone and Cartilage", Athens, GA, May 2005.
- Invited Speaker, "5<sup>th</sup> International Conference on Bone Morphogenetic Proteins", Nagoya, Japan, September, 2004.
- Invited Speaker, "Wound Healing Society", Atlanta, GA, May, 2004.
- Invited Speaker, "Center for Craniofacial Regeneration Seminar Committee", Ann Arbor, MI, March, 2004.
- Invited Speaker, "American Association of Tissue Banks", Clearwater, FL, March, 2004.
- Invited Speaker, "133<sup>rd</sup> TMS Annual Meeting & Exhibition", Charlotte, NC, March, 2004.
- Invited Speaker, "Introducing the Inaugural Southeast Workshop on Tissue Engineering and Biomaterials", Clemson, SC January 2004.
- Invited Speaker, "MRS Annual Meeting", Boston, MA, December, 2003.
- Invited Moderator "Surfaces in Biomaterials Foundation", Savannah, GA, October, 2003.
- Invited Faculty, "American College of Spine Surgery's 2003 Annual Meeting and Spine Surgery Review Course", Naples, Florida, September, 2003.
- Invited Speaker "Third International Meeting on Rapid Responses to Steroids Hormones, Florence Italy September, 2003.
- Invited Speaker, "AAOS Scientific Workshop-Physical Regulation of Skeletal Repair", Maryland, September, 2003.
- Invited Speaker, "ITI Annual Meeting", Zurich, August, 2003.
- Invited Speaker, "33<sup>rd</sup> International Sun Valley Hard Tissue Workshop", Sun Valley, Idaho, August, 2003.
- Invited Speaker, "III International Meeting Rapid Response s to Steroid Hormones" Washington, DC, July, 2003.
- Organizer, "Meeting with Biora AB", Chicago, July, 2003.
- Invited Speaker, "12<sup>th</sup> Workshop on Vitamin D", Maastricht, Netherlands, July, 2003.
- Invited Faculty, "ECM IV Bone Tissue Engineering", Davos, Switzerland, June, 2003.
- Invited Speaker, "Arthritis Research Conference", Colorado, June, 2003.
- Invited Speaker, "3<sup>rd</sup> International Symposium on Mechanobiology of Cartilage and Chondrocytes", Brussels, May, 2003.
- Invited Speaker, "International Symposium on Interface Biology of Implants, Rostock Germany, May, 2003.
- Session Chair, "Society for Biomaterials", Reno Nevada, May, 2003.
- Invited Speaker, "BEMA Meeting", Washington, D.C., April, 2003.

Invited Speaker, "Engineering Tissue Growth 2003", Pittsburgh, PA, March, 2003.

Invited Speaker, "4<sup>th</sup> KTI (Kansai Tissue Engineering Initiative) Workshop, Japan, March, 2003.

Invited Speaker, "OPHS Workshop" Washington, D.C., March, 2003.

Invited Presenter, "2003 AAOS Annual Meeting", New Orleans, LA, February, 2003.

Invited Moderator, "AAOS / NIH Tissue Engineering in Musculoskeletal Clinical Practice Workshop" Santa Fe, NM, January, 2003.

Invited Speaker, "Advances in Healthcare through Biomedical Engineering," Emory MiniMedical School, October 2002.

Invited Speaker, "Optimizing Tissue Engineering for Cartilage," Tissue & Genetic Engineering for the Treatment of Arthritic Diseases, The Knowledge Foundation, 2nd Annual International Conference, Providence, RI, October 4-5, 2001.

Invited Speaker, "Juggling Research, Teaching and Life," Faculty Development Lecture, "Dental Implant Research and the Clinical Practice of Dentistry," Brauman-Bell Lectureship, Baylor College of Dentistry, Dallas, TX, November 2, 2000

Invited Speaker, "Influence of Surface Roughness on Osteoblasts, ETH, Zurich, Switzerland, August 10, 2000.

Invited Speaker, "Influence of Surface Roughness on Osteoblasts," Seminar, Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland, August 11, 2000.

Invited Speaker, "New Materials for Cartilage Repair", MacArthur Cartilage Repair Workshop, New York, NY, May, 2000.

Invited Speaker, "Rapid Responses of  $1\alpha,25(\text{OH})_2\text{D}_3$  in Cartilage," Eleventh Workshop on vitamin D, Nashville, TN, May, 2000.

Invited Speaker, Annual Update on Women's Health Research: Discoveries and Implications, Ninth Annual Scientific Advisory Meeting, Society for Women's Health Research, Washington, DC, October, 1999.

Invited Speaker, "Mesenchymal Cell Response to Biomaterials Is Modulated by Their Maturation State in Their Lineage Cascade," Biomaterials and Cellular Responses Session, First Joint Meeting of BMES and EMBS, Atlanta, GA, October, 1999.

Invited Speaker, "Membrane-mediated Mechanisms of Steroid Hormone Action and their Role in Growth Plate Development: Evidence for a New Class of Receptors for  $1,25-(\text{OH})_2\text{D}_3$  and  $24,25-(\text{OH})_2\text{D}_3$ ," Medicine Research Conference, Department of Medicine, The University of Texas Health Science Center at San Antonio, October, 1998.

Invited Speaker, "Ankylosing Spondylitis: HLA-B27 and Beyond" Conference, National Institute of Arthritis and Musculoskeletal and Skin Diseases, NIH, Bethesda, MD, September, 1998.

Invited Speaker, "Vitamin D Metabolites in Calcification; The Role of Matrix Vesicles," Scientific Symposium I: Biomineralization, Annual Meeting of the American Society for Gravitational and Space Biology, Houston, TX, October, 1998.

Invited Speaker, "Estrogenic and Vitamin D Effects in Cartilage Matrix Vesicles which Contain No Nuclei," Session - Tissue Specific Responses: Bone, 1999 FASEB Summer Research Conference, "Steroid Receptor Family Members in the Plasma Membrane: The Proteins and their Functions, Copper Mountain, Colorado, August, 1999.

Invited Speaker, "Restoration of Function," Oral Health Discoveries for the 21<sup>st</sup> Century, National Institute of Dental Research, The University of Alabama School of Dentistry, Birmingham, AL, May, 1998.

Invited Speaker, "Matrix Vesicle Proteases in Mineralization," Division of Rheumatology and Immunology, University of Miami School of Medicine and Geriatrics Research, Education, and Clinical Center, Miami Veterans Affairs Medical Center, Miami, FL, May, 1998.

Invited Speaker, "Vitamin D Metabolism in the Growth Plate," Basic Science Teaching Series, Rhode Island Hospital, Brown University School of Medicine, Providence, RI, May, 1998.

Invited Speaker, "Concepts in Cartilage Repair," Orthopaedic Grand Rounds, Rhode Island Hospital, Brown University School of Medicine, Providence, RI, May, 1998.

Invited Speaker, Combined Meeting of the German Society for Endocrinology, the Orthopaedic Society for Osteology, and the Austrian Society for Osteology, Germany, February, 1999.

Invited Speaker, "Tissue Engineering," Restoration of Function Session, Oral Health Discoveries for the 21st Century Symposium, University of Alabama, Birmingham, AL, May, 1998.

Invited Speaker, "Sources for Alternate Funding," AAOS, Grant Writing Symposium, October, 1997.

- Invited Speaker, "Spin-off Opportunities for University-based Biomedical Research in Texas," Texas Technology Summit, Austin, September, 1997.
- Invited Speaker, "The Synergistic Effects of Vitamin D<sub>3</sub> Metabolites on Costochondral Chondrocytes Are Mediated by Increases in PKC Activity," Session I - TGFβ Signaling, Department of Surgery Works in Progress Symposium, UTHSCSA, October, 1997.
- Invited Speaker, "Growth Plate Chondrocytes Store Latent TGFβ in Their Matrix Through Latent TGFβ Binding Protein," Session V - TGFβ, Mismatch Repair and Other Cytokines, Department of Surgery Works in Progress Symposium, UTHSCSA, October, 1997.
- Invited Speaker, "Cartilage Repair," Orthopaedic University Hospital of Zurich, Balgrist, Switzerland, May, 1997.
- Invited Speaker, "Technology Transfer," Development Board, Planned Giving Advisory Council Meeting, UTHSCSA, December 1996.
- Invited Speaker, "Cellular Response to UHMWPE Particles," Session IV - Biological Aspects, Wear and Its Consequences in Total Joint Prostheses, Society of Biomaterials Short Course, San Antonio, TX, April, 1996.
- Invited Speaker, "Particle Imaging," Wear and Its Consequences in Total Joint Prostheses Short Course, Society for Biomaterials Annual Meeting, April, 1996.
- Invited Speaker, "Spinal Therapy and/or Arthritic Treatments," Annual Meeting, American Academy of Gold Foil Operators, November 1996.
- Invited Speaker, "New Concepts on the Role of Vitamin D in Endochondral Bone Development," Research Seminar, Department of Pediatrics, UTHSCSA, 1995.
- Invited Speaker, "You Don't Have to be a Nerd to be a Scientist," Northside ISD Gifted and Talented Seminar: Innovators: San Antonio's Ingenious Minds, San Antonio, TX, 1995.
- Invited Panelist, "Medical Science and the Device Industry Put Tort Law on Trial," sponsored by AAAS Section on Engineering, AAAS, Atlanta, GA, 1995.
- Invited Speaker, Northern Rockies Joint Workshop on Osteoporosis and Osteoarthritis, 8/25-30/96.
- Invited Speaker, "Research Collaborations," Ethicon, Inc., 1995.
- Invited Speaker, "Futures in Orthopaedic Research," Wright Medical Technology, Inc., 1995.
- Invited Speaker, "New Concepts on the Regulation of Endochondral Bone Formation," Department of Pediatrics Research Seminar Series, UTHSCSA, January 5, 1994.
- Invited Speaker, "Local and Systemic Effects of Biomaterials on Bone Formation," Lunch and Learn Program, IADR, March 21, 1994.
- Invited Speaker, "Genomic and Nongenomic Effects of Vitamin D on Chondrocytes *in Vitro*," International Symposium on Mechanism of Chondrocyte Proliferation, Cartilage Growth and Repair, Osaka, Japan, November, 1994.
- Invited Speaker, Panel Member, "Writing Winning Grants - Symposium--The Reviewers' Perspective," UTHSCSA, March 25, 1994.
- Invited Speaker, "Are the Biological Actions of 1α,25(OH)<sub>2</sub>D<sub>3</sub> and 24,25(OH)<sub>2</sub>D<sub>3</sub> in Chondrocytes and their Matrix Vesicles Genomic or Nongenomic?," Ninth Workshop on Vitamin D, Orlando, FL, February, 1994.
- Invited Speaker, "The Emergence of Women as Academia's Entrepreneurs," San Antonio Professional Women's Alliance, UTHSCSA, November, 1993.
- Invited Speaker, "Nongenomic Effects of Vitamin D Metabolites," 1993-1994 Houston Matrix Assembly Seminar Series, M.D. Anderson Cancer Center, Houston, TX, 1993.
- Invited Speaker, "Development of an *in Vivo* Model of Endosteal Bone Healing," Miles Institute, Miles Inc., West Haven, CT, 1993.
- Invited Speaker, "Dental Education in the 21st Century," University of Florida, Gainesville, FL, 1993.
- Invited Speaker, "Regulation of Endochondral Ossification," Miles Institute, Miles Inc., West Haven, CT, 1993.
- Invited Speaker, Grand Rounds, Department of Orthopaedics, Baylor College of Medicine, Houston, TX, 1993.
- Invited Speaker, Boehringer-Mannheim DePuy, Warsaw, IN, 1993.
- Invited Speaker, American Biogenetic Sciences, Inc., South Bend, IN, 1993.
- Invited Speaker, Department of Biochemistry, Rush Presbyterian St. Luke's Medical School, Chicago, IL, 1992.

- Invited Speaker, "Barriers and Opportunities in Biomedical Research: Views of a University Researcher," NSF and Whitaker Foundation Workshop on University/Industry Interaction in Biomedical Engineering, Washington, DC, October, 1992.
- Invited Speaker, Conference on Tissue Interfaces in the Musculoskeleton in Health, Disease and Repair, Gordon Research Conference on Bioengineering and Orthopaedic Surgeons, August, 1992.
- Invited Speaker, "Osteobiologics," Annual Provost Fund I, LP, April, 1992.
- Invited Speaker, "Business Potentials from Industry-University Cooperative Research," Business Plan Development Conference/Workshop, San Antonio, TX, January, 1992.
- Speaker, "Recruitment and Retention of Members," IUCRC Center Directors' Meeting, NSF, January, 1992.
- Invited speaker, "Private Industry and Medical Research," Medicine in Mexico, Medicine in San Antonio-An Academic Encounter, San Antonio, TX, September, 1991.
- Keynote Speaker, "Women and Careers in Science and Technology," Expanding Your Horizons in Science and Mathematics Conference, San Antonio, TX, February 1991.
- Invited speaker, "Cell Biology," Industry Advisory Board of IUCRC for Biosurfaces, SUNY/Buffalo, NY, January, 1991.
- Invited Speaker, "Transfer of Technology in the Biomedical Industry," NIDR, May, 1990.
- Invited Speaker, "Technology Transfer in the Biotech Industry," Technology Transfer Study Group, Austin, TX, April, 1990.
- Invited Speaker, "The Establishment and Operation of an NSF-Funded University-Industry Consortium," The Louisville Advanced Technology Council, Inc., January, 1990.
- Invited Consultant, "Development of an Industry-University Cooperative Research Center in Hospital Administration," The Western Network for Education in Health Administration, January, 1990.
- Invited Speaker, "Regulation of Endochondral Ossification," Eastman Dental Center, September, 1989.
- Invited Speaker, "Regulation of Endochondral Ossification," Emory University, August, 1989.
- Invited Speaker, "Regulation of Endochondral Ossification," Unilever Research, Port Sunlight, England, June, 1989.
- Invited Speaker, "Hormonal Regulation of Membrane-Mediated Biologic Calcification," American Chemical Society Symposium, Dallas, TX, 1989.
- Invited Speaker, "Mechanism of Vitamin D Regulation of Endochondral Ossification," Department of Biochemistry, University of Toronto, 1989.
- Invited Speaker, "Direct Effects of Vitamin D Metabolites on Membranes," Department of Pharmacology, UTHSCSA, 1989.
- Session Chairman, "Role of Extracellular Macromolecules in Biomineralization," Gordon Research Conference on Bones and Teeth, July, 1989.
- Invited Speaker, "The Future of Biotechnology in San Antonio," Northside Chamber of Commerce Development Trends Symposium, San Antonio, TX, 1988.
- Invited Speaker, "Mechanisms of Microbial Calcification," International Conference on Formation, Treatment and Epidemiology of Dental Calculus, Amsterdam, Netherlands, 1988.
- Invited Speaker, "Anti-Calculus Agents," Procter and Gamble, 1988.
- Invited Speaker, "Where Research in Oral Health is Taking Dentistry," Texas Dental Association, Texas Association of Woman Dentists, 1988.
- Invited Speaker, "Endochondral Bone Growth," Campbell Soup Institute, Fayetteville, AR, February, 1988.
- Invited Speaker, "Autocrine, Paracrine and Endocrine Regulation of Endochondral Ossification", Genentech, San Francisco, CA, 1988.
- Invited Speaker, "Role of Proteolipids in Calcification of Cartilage," Department of Chemistry, University of South Carolina, March, 1988.
- Invited Speaker, "Vitamin D Regulation of Chondrogenesis," Advances in Mineral Metabolism, Snowmass, CO, April, 1988.
- Invited Speaker, "Autocrine and Paracrine Regulation of Bone Metabolism," IADR, Montreal, Canada, March, 1988.
- Invited Speaker, "Mechanisms of Lipid-Dependent Calcification," International Mini-Conference on Biomineralization, Canadian Association for Dental Research, Montreal, Canada, March,

- 1988.
- Invited Speaker, "Dental Calculus Formation and Prevention," La Academia Mexicana de Odontopediatria, Mexico City, Mexico, October, 1987.
- Invited Speaker, "Biologic Calcification," Academia de Odontologica Pediatrica, Dominican Republic, January, 1988.
- Invited Speaker, "An *in Vitro* Model for Endochondral Differentiation, Advances in Mineral Metabolism", Snowmass, CO, March, 1987.
- Symposium Organizer and Speaker, "The Role of Membranes in Biologic Calcification," AAAS, Austin, TX, March, 1987.
- Invited Speaker, "Implant Tissue Interactions," University of North Carolina Dental Research Institute, April, 1987.
- Invited Speaker and Symposium Chair, "Calcium: Metabolism, Transport, and Binding Proteins", SWARM Division of AAAS, April, 1987.
- Invited Speaker, "Proteolipids in Biomineralization," Greater Kansas City Bone and Tooth Society, December, 1986.
- Invited Workshop Leader, "Biochemistry of the Implant-Tissue Interface," Engineering Foundation Conference in Bioceramics, November, 1986.
- Invited Speaker, "Matrix Vesicle Biogenesis," Department of Pathology, University of Kansas Medical Center, May, 1986.
- Invited Speaker, "Mechanisms of Biologic Calcification," Washington University School of Dental Medicine, 1986.
- Invited Speaker, "Mechanisms of Biologic Calcification," Dows Institute for Dental Research, University of Iowa, 1985.
- Invited Speaker, "Proteolipid-Dependent Calcification," Incarnate Word College, MBRS Program, San Antonio, TX, 1985.
- Session Chairman, "Mechanisms of Mineralization," Gordon Research Conference on Calcium Phosphates, June, 1985.
- Session Chairman, "Mineral Ion Transport through Cells," Gordon Research Conference on Bones and Teeth, July, 1985.
- Invited Speaker, Fifth International Symposium on Matrix Vesicles, Cambridge, England, 1985.
- Invited Speaker, Second International Conference on Chemistry and Biology of Mineralized Connective Tissues, Gulf Shores, AL, September, 1984.
- Invited Speaker, American Association for the Advancement of Science Symposium on Calcified Tissues, New York, NY, May, 1984.
- Invited Speaker, Scanning Electron Microscopy Society Symposium on Calcium and Crystals in Diseases, Philadelphia, April, 1984.
- Invited Speaker, Non-Collagenous Matrix Proteins Satellite Meeting, American Society for Bone and Mineral Research, San Antonio, June, 1983.
- Consultant, Procter and Gamble, "Mechanism of Microbial Mineralization: A Model for Membrane-Mediated Vertebrate Calcification," Cincinnati, OH, July, 1983.
- Invited Speaker, Fourth International Symposium on Calcium Binding Proteins in Health and Disease, Trieste, Italy, May, 1983.
- Invited Speaker, Fifth International Workshop on Calcified Tissues, Kiryat Anavim, Israel, March, 1982.
- Invited Speaker, Calcific Disease Mini Symposium, FASEB, New Orleans, LA, April, 1982.
- Invited Speaker, Third International Symposium on Matrix Vesicles, Spoleto, Italy, June, 1981.
- Invited Speaker, First International Conference on the Chemistry and Biology of Mineralized Connective Tissues, Chicago, IL, May, 1981.
- Invited Speaker, Second International Symposium on Matrix Vesicles, State University of New York, Purchase, NY, June, 1978.
- Invited Speaker, "On the Acid-Base Balance of Gastropod Molluscs," at the International Symposium on the Mechanisms of Mineralization in Invertebrates and Plants, October, 1974.
- Conference Participant, "The Chemistry and Physiology of Bones and Teeth," Gordon Research Conference on Structure, 1974-1985 (presented papers 1976, 1978, 1979, 1980, 1981).

## VI. Grants and Contracts since 2005

### As Principal and Co-principal Investigator

#### ACTIVE

R01 AR052102-05 (Boyan) 3/2011-2/2016 2.0 calendar months  
 NIH/NIAMS \$350,000 direct costs annually  
 Mechanisms of Cell/Surface Interaction  
 Goal: This grant studies the mechanisms that mediate the responses of mesenchymal cells to biomaterials.

Atlantic Pediatric Device Consortium 9/2013-8/2018 0.5 calendar months  
 FDA \$750,000 total costs annually  
 Goal: To develop pediatric devices.

UL1 RR025008 (Stephens) 2009-2012 0.5 calendar months  
 NIH/NCRR \$300,000 (direct to Georgia Tech)  
 Atlanta Clinical and Translational Science Institute  
 Goal: The overall goal of the CTSA award is to provide structural support to facilitate transfer of technology from bench to bedside. Funds to Georgia Tech are used to support stipends and tuition for an MS degree in Clinical and Translational Research, to support faculty teaching in the bioethics course, and to support research in biomedical informatics related to clinical research.

U.S. Department of Defense (Boyan) 9/1/08 to 8/31/14 2.0 calendar months  
 \$7.7 million total costs  
 Center for Advanced Engineering for Soldier Sustainability  
 Goal: The major goal of this grant is the development of stem cell delivery technologies.

U.S. Department of Defense (Guldborg) 2008-2013 0.5 calendar months  
 Armed Forces Institute of Technology Subproject \$1,000,000 total costs  
 Spatial and Temporal Control of Vascularization and Innervation of Composite Tissue Grafts  
 Goal: This project is developing a rat segmental defect model for testing materials used to treat composite injuries.

Children's Healthcare of Atlanta (Boyan) 7/1/10 to 6/30/15 2.0 calendar months  
 Children's Healthcare of Atlanta's \$5,000,000 total costs  
 Center for Pediatric Healthcare Technology Innovation  
 Goal: This funds supports the Laboratory for Craniofacial Plastic Surgery through 2012; provides administrative support to manage the Georgia Tech/CHOA seed grant program, and funds seed grants to develop technologies for use in children. No funds are used to support cell/Ti interaction research.

Price Gilbert, Jr. Foundation (Boyan) 2006-2010  
 \$400,000 total costs  
 Goal: Development of an ERp60 Knockout Mouse

#### PENDING FUNDING

1 R01 AR060896-01 (Boyan) 4/1/2011-3/31/2016 1.8 calendar months  
 NIH/NIAMS 2,498,606.00 total costs  
 Membrane Mechanisms of Vitamin D Action in Bone and Cartilage

Goal: This project examines the molecular actions of 1,25-dihydroxy vitamin D3 in osteoblasts and chondrocytes.

### PAST FUNDING

R01 AR052102 (Boyan) NIH/NIAMS Mechanisms of Cell/Surface Interaction Goal: This grant studies the mechanisms that mediate the responses of mesenchymal cells to biomaterials.	8/2006-7/2011 \$240,000 (direct)	2.0 calendar months
U.S. Department of Defense (Guldberg) Engraftment Strategies for Functional Repair of Composite Musculoskeletal Injuries Dr. Boyan receives \$37,000 per year to offset costs related to the development of decellularized muscle grafts.	2009-2012	0.5 calendar months
Protocol 06143006 U.S. Army Institute of Surgical Research Adipose-derived Mesenchymal Stem Cells for treatment of Large Bone Defects PI: Barbara D. Boyan		2007-2010 \$1.6 million total costs
ITI Grant 490-2006 ITI Foundation Mechanisms of Endogain Action in Peri-Implant Osteogenesis PI: Barbara D. Boyan		2007-2009 \$149,000 direct
Boston Scientific Corporation Restoration of Bone Marrow Compartment in Aged Rats Phase I PI: Barbara D. Boyan		2007-2008 \$193,000 total costs
Georgia Research Alliance Challenge Grant Adipose-derived Mesenchymal Stem Cells to Treat Large Bone Defects Co-PI: Barbara D. Boyan; Co-PI: Clifton Baile		9/1/06 to 8/31/07 \$50,000 total costs
NIH/NCI #1U54CA119338-02 NIH Center of Cancer Nanotechnology Excellence (Shuming Nie, PI) Annually Project #2 - Activatable Nanoprobes for Cancer Detection and Analysis Gang Bao, PI; Barbara Boyan, Co-PI Education Core, BDB, Co-PI		9/1/05 to 8/30/10 \$35,000 direct
Children's Healthcare of Atlanta CHOA Laboratory for Craniofacial Plastic Surgery Research PI: Barbara D. Boyan		7/1/05 to 6/30/09 \$2,000,000 total costs
NSF #103573 In Vitro Dissolution, Resorption, and Biocompatibility Laurie Gower, PI, Subcontract to BDB		2/1/06 to 7/31/08 \$300,000 total costs
Price Gilbert, Jr. Foundation Development of an ERp60 Knockout Mouse		5/1/06 to 4/30/08 \$200,000 gift
ITI Project 2003 ITI Foundation Multifunctional Titanium Implant Surface Marcus Textor, PI; Subcontract to BDB		9/1/04 to 8/31/07 \$37,000 direct annually



Various Donors (Boyan) Assessment of Osteoinduction Activity of DBM Formulations	approximately \$100,000
BIOMET Effect of Pulsed Electromagnetic Fields on Bone and Cartilage Cells PI: Barbara D. Boyan	\$100,000 annual gift
NSF EEC9731643 (Nerem) Georgia Tech/Emory Center for the Engineering of Living Tissue "Design Requirements for Musculoskeletal Tissue Engineering" (BDB subgrant) "Preclinical Studies of a Hydrogel Spinal Disc Prosthesis" (BDB subgrant) "Bioreactor Conditions to Enhance Architecture of Tissue-Engineered Cartilage for Improved Material Properties" (BDB subgrant) "In Process Cryopreservation of Tissue Engineered Cartilage" (BDB subgrant)	1998 – 2008
1R41 AR051254 NIH/NIAMS Development of Hydrogel Spinal Disc Replacement PI: Barbara D. Boyan	9/1/04 to 8/31/06 \$107,000 total costs
Georgia Research Alliance Integration of Biomaterials with Biologic Tissues: Disc Annulus Repair Patch PI: Barbara D. Boyan	9/1/05 to 8/31/06 \$50,000 total costs
Georgia Research Alliance Eminent Scholar Challenge Grant Investigation of Vitamin D receptors in Adipocytes from Bone Marrow and Fat Pads Co-PI: Barbara D. Boyan; Co-PI: Clifton Baile	9/1/05 to 8/31/06 \$50,000 total costs
NIH (Gall/Boyan) Soft tissue Orthopaedic Fixation with Shape Memory Polymers	2006-2010

## VII. HONORS AND AWARDS

Fellow, National Academy of Inventors, 2016

Member, Tau Beta Pi, 2016

Member, National Academy of Engineering, 2012

College of Fellows, International Union of Societies of Biomaterials Science and Engineering, 2012

Women's Leadership Award, Orthopaedic Research Society, 2012

ASTM Manny Horowitz Award for service to the F04 Division as Chair of the Assessments Subcommittee, 2009

Fellow, American Institute for Medical and Biological Engineering, 2006

Recipient, *Atlanta Woman Magazine* Top Innovator in Science Award, 2005

Member, National Materials Advisory Board, National Academies, 2003-2009

Recipient, The Birnberg Research Award, Columbia University School of Dental and Oral Surgery, 2003

Recipient, Georgia Research Alliance Eminent Scholar, 2002 - present

Recipient, Society for Biomaterials, Clemson Award for Contributions to the Literature, 2001

Co-recipient Albert-Hoffa-Prize (with Drs CH Lohmann, Z Schwartz, Y Liu, H Guerkov, B Simon, BD Boyan), Die Norddeutsche Orthopädenvereinigung e.V (North German Orthopaedic Society) Research Prize, 2001

Co-recipient, American Academy of Periodontology, R. Earl Robinson Regeneration Award (with Drs Z Schwartz, DD Dean, CH Lohmann, D Andreacchio, TC Weesner, DL Carnes, DL Cochran), October, 2001

Recipient, Certificate of Appreciation, ASTM Committee F-4 Awards Subcommittee, 2001

Fellow, American Association for the Advancement of Science, elected 2000

Recipient, AADR Student Research Group Mentor Award, American Association for Dental Research, Washington, D.C., April 7, 2000

Co-Recipient of 1999 R. Earl Robinson Periodontal Regeneration Award, American Academy of Periodontics

Co-recipient, American Academy of Periodontology R. Earl Robinson Regeneration Award, 1997

Basic Research in Biologic Biomineralization Award, International Association for Dental Research, 1995

San Antonio Women's Hall of Fame 1988-1989 Honoree in Science and Technology

Lifetime Honorary Member Achievement Award, Alpha Omega International Dental Fraternity, 1987-1988

Recognition Award, San Antonio Women's Hall of Fame, 1986

Appreciation Award, Sophomore Dental Student Summer Research Fellows, 1985

Honorary Member, Alpha Omega International Dental Fraternity Regency 25, 1985

Tenure, Department of Periodontics, The University of Texas Health Science Center, 1984

Research Career Development Award, NIH-NIDR, DE-00056 and DE-00107 "Proteolipid and Calcification of Bones and Teeth," 1978-1983

NIDR Postdoctoral Fellowship, "A Biochemical Study of Calcifiable Microorganisms,"

1974-1977, DE-00669

Awarded a National Research Council-National Academy of Sciences, Postdoctoral Research Associateship for 1974-1975 (declined in favor of NIDR fellowship)