CURRICULUM VITAE

Xiang-Dong Edward Guo, B.S., M.S., Ph.D.
Chair and Professor of Biomedical Engineering

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A. Field of Specialization

Biomechanics: Bone Mechanics, Imaging Analysis of Bone Microstructure, Biomechanics of Bone Cells, Micro patterning of Cells, Cell Mechanics, and Mechanobiology

B. Academic Training

Colleges and Universities Attended

1980-1984 Undergraduate Study in Applied Mechanics, Department of Mechanics, Peking University, Beijing, P. R. China
B.S. in Applied Mechanics
Bachelor Thesis: Diffusion of Macromolecules Across the Arterial Wall in the Presence of Multiple Endothelial Injuries, Sponsor: Professor Gong-Bi Wen

Published: **Guo, X.** and Wen, G-B (1985) Diffusion of macromolecules Across the Arterial Wall in the Presence of Multiple Endothelial Injuries, Proceedings of the 1st National Youth Biomedical Engineering Conference of China (received Class Award), Anhui, P. R. China.

1984-1988 Graduate Study in Biomechanics, Department of Mechanics, Peking University, Beijing, P. R. China

1988-1989 Doctoral Graduate Study in Mechanical Engineering, Department of Mechanical Engineering, The City College of the City University of New York, New York, New York

1989-1990 Graduate Study in Engineering Science, Division of Applied Sciences, Harvard University, Cambridge, Massachusetts
M.S. in Engineering Sciences

1990-1994 Doctoral Graduate Study in Medical Engineering and Medical Physics, Harvard-MIT Division of Health Science and Technology
Division of Applied Sciences, Harvard University, Cambridge, Massachusetts

Ph.D. in Medical Engineering and Medical Physics (Harvard University)
Ph.D. Thesis: Fatigue of Trabecular Bone, Sponsors: Professors Thomas A. McMahon, Wilson C. Hayes, and Lorna J. Gibson

Published: Michel, M. C., **Guo, X.-D.**, Gibson, L. J., McMahon, T. A. and Hayes, W. C. (1993) Compressive Fatigue Behavior of Bovine Trabecular Bone, *J. Biomechanics*, **26**, p453-463.

Guo, X. E., Gibson, L. J., McMahon, T. A., Keaveny, T. M. and Hayes, W. C. (1994) Finite Element Modeling of Damage Accumulation in Trabecular Bone Under Cyclic Loading, *J. Biomechanics*, **27**, p145-155.

Keaveny, T. M., **Guo, X. E.**, Watchtel, E. F., McMahon, T. A. and Hayes, W. C. (1994) Trabecular Bone Exhibits Fully Linear Elastic Behavior and Yields at Low Strains, *J. Biomechanics*, **27(9)**: 1127-1136.

Keaveny, T. M., Watchtel, E. F., **Guo, X. E.**, and Hayes, W. C. (1994) The Mechanical Properties of Damaged Trabecular Bone, *J. Biomechanics*, **27(9)**: 1309-1318.

Bowman, S. M., **Guo, X. E.**, Cheng, D. W., Keaveny, T. M., Gibson, L. J., Hayes, W. C. and McMahon, T. A. (1998) Creep Contributes to the Fatigue Behavior of Bovine Trabecular Bone, *J. Biomech. Eng.*, **120**, p647-654.

Bowman, S. M., **Guo, X. E.**, Cheng, D. W., Keaveny, T. M., Gibson, L. J., Hayes, W. C., and McMahon, T. A. (1998) Creep Contributes to the Fatigue Behavior of Bovine Trabecular Bone, J. Biomech. Eng., 120(5): 647-654.

Guo, X. E., and Gibson, L. J. (1999) Behavior of Intact and Damaged Honeycombs: A Finite Element Study, *Intl. J. Mech. Eng.*, **41**, p85-105.

1993-1996 Postdoctoral Research in Orthopaedic Bioengineering, Orthopaedic Research Laboratories, The University of Michigan, Ann Arbor, Michigan,
Mentor: Professor Steven A. Goldstein

1997 Trainee of Summer Course in Physiology: Molecular Signal Transduction (funded by NIH training grant), Marine Biology Laboratory, Woods Hole, Massachusetts

C. Employment Record and Professional Experience

1984-1988 Graduate Research Assistant, Department of Mechanics, Peking University Beijing, P. R. China
1988-1989 Graduate Research Assistant, Department of Mechanical Engineering, The City College of the City University of New York
1990-1993 Graduate Research Assistant, Orthopaedic Biomechanics Laboratory,

	Harvard University Medical School
1993-1996	Postdoctoral Research Fellow, Orthopaedic Research Laboratories, University of Michigan
1996-1998	Assistant Professor of Mechanical Engineering, Department of Mechanical Engineering, Columbia University
1997-1999	Chair, Graduate Committee, Center for Biomedical Engineering, Columbia University
1998-2001	Assistant Professor of Biomedical Engineering, Department of Biomedical Engineering, Columbia University
1999-2003	Chair, Undergraduate Committee, Department of Biomedical Engineering, Columbia University
2004-2006	Chair, ABET Committee, Department of Biomedical Engineering, Columbia University
2001-2007	Associate Professor of Biomedical Engineering, (with tenure 2003) Department of Biomedical Engineering, Columbia University
2004-2007	Associate Professor of Dental and Craniofacial Bioengineering (in Dentistry), College of Dental Medicine, Columbia University
2007-present	Professor of Biomedical Engineering, Department of Biomedical Engineering, Columbia University
2009-2014	Chair, Undergraduate Committee, Department of Biomedical Engineering
2014-2017	Vice Chair, Department of Biomedical Engineering, Columbia University
2017-present	Chair, Department of Biomedical Engineering, Columbia University
2018-present	Stanley Dicker Professor of Biomedical Engineering, Columbia University

Research Appointments

1984-1988	Graduate Research Assistant, Department of Mechanics, Peking University
1988-1989	Graduate Research Assistant, Department of Mechanical Engineering, The City College of the City University of New York
1990-1993	Graduate Research Assistant, Orthopaedic Biomechanics Laboratory, Harvard University Medical School
1993-1996	Postdoctoral Research Fellow, Orthopaedic Research Laboratories, The University of Michigan
1996-2001	Associate in Orthopaedic Research, New York Orthopaedic Hospital Research Laboratory, New York-Presbyterian Hospital
1997-present	Director, Bone Bioengineering Laboratory, Department of Biomedical Engineering, Columbia University
2008	Visiting Professor, School of Aeronautics and Astronautics, Xian Jiaotong University, Xian, P. R. China
2012	Visiting Professor, the Fourth Military Medical University, Xian, P. R. China
2014	Visiting Professor, Beijing Institute of Technology, Beijing, P. R. China
2014	Visiting Professor, Sichuan University, Chengdu, P. R. China

Fellowships and Honors

1985	Class Award from the First National Youth Biomedical Engineering Conference of P. R. China.
1989	Graduate Fellowship, Division of Applied Sciences, Harvard University
1990	HST Graduate Fellowship, Harvard-MIT Division of Health Science and Technology
1992	The New Investigator Recognition Award, Orthopaedic Research Society
1994	Postdoctoral Trainee of National Institute on Aging
1995	National Research Service Award, National Institutes of Health
1997	Marine Biological Laboratory Summer Course Fellowship, Marine Biological Laboratory
1999	National Science Foundation CAREER Award
2006	Funds for Talented Professionals (Joint Research Fund for Overseas Chinese Young Scholars), National Natural Science Foundation of China
2006	Fellow, American Institute for Medical and Biological Engineering
2014	1000Plan Professorship, West China School of Stomatology, Sichuan University
2016	Fellow, International Combined Orthopaedic Research Societies
2018	Fellow, International Academy of Medical and Biological Engineering
2018	Fellow, American Society for Mechanical Engineers

Honors by Trainees

2008	Dr. X. Sherry Liu (postdoctoral fellow/graduate student), The New Investigator Recognition Award, Orthopaedic Research Society
2009	Mr. Songlin James Peng (exchange graduate student), The New Investigator Recognition Award, Orthopaedic Research Society
2013	Ms. Ji Wang (graduate student), Howard Hughes Medical Institute International Student Research Fellowship

Society Membership

Member	American Society of Mechanical Engineers, since 1993
Member	American Society of Biomechanics, since 1993
Member	Orthopaedic Research Society, since 1995
Member	Sigma Xi Scientific Research Society since 1998
Member	American Association for the Advancement of Science, since 1998
Vice-Chair	Solid Mechanics Committee of Bioengineering Division of American Society of Mechanical Engineers, 2001
Track Chair	Orthopaedic Bioengineering Track, 2005 Annual Meeting of Biomedical Engineering Society
Member	US National Committee on Biomechanics since 2005
Member	Provisional Executive Committee, World Association of Chinese Biomedical Engineers 2005
Track Chair	Cellular and Molecular Biomechanics, Orthopaedic Research Society 2005-2008
Member	World Council of Biomechanics, 2006-2018
Treasurer	World Association of Chinese Biomedical Engineers, 2007-2009
Member	Council, The Society for Physical Regulation in Biology and Medicine

President-Elect International Chinese Hard Tissue Society 2009-2011

President	International Chinese Hard Tissue Society 2011-2013
Program Chair	The Society for Physical Regulation in Biology and Medicine, 2010-2011
Vice President	The Society for Physical Regulation in Biology and Medicine, 2011-2012
President	The Society for Physical Regulation in Biology and Medicine, 2012-2013
Member	Board of Directors, International Chinese Hard Tissue Society 2009-2011
Member	Program Committee of Orthopaedic Research Society, 2009-2010
Member	Membership Committee of Orthopaedic Research Society, 2010-2011
Vice Chair	Membership Committee of Orthopaedic Research Society, 2011-2012
Chair	Inaugural Cellular and Molecular Bioengineering Conference, 2011
Chair	Membership Committee of Orthopaedic Research Society, 2012-2013
Member	Board of Directors, Orthopaedic Research Society, 2012-2013
Member	Board of Directors, American Institute for Medical and Biological Engineering
Chair	Founding Chair, Special Interest Group of Cellular and Molecular Bioengineering, Biomedical Engineering Society 2012-2013
Member	Member-at-Large, Board of Directors, Orthopaedic Research Society, 2013-2015
Track Chair	Biomechanics, Annual Meeting of Biomedical Engineering Society, 2013
Chair	Inaugural ICMRS-ASBMR International Chinese Musculoskeletal Research Conference, Suzhou, P. R. China, 2013
Chair	Inaugural NSF International Workshop on Multiscale Mechanobiology, Hong Kong, 2014
Vice Chair	Cellular and Tissue Engineering Committee, Bioengineering Division, American Society of Mechanical Engineers 2014-2017
Chair	Cellular and Tissue Engineering Committee, Bioengineering Division, American Society of Mechanical Engineers 2017-2020

Review and Advisory Activities

Reviewer	Journal of Biomechanics, since 1994
Reviewer	ASME Journal of Biomechanical Engineering, since 1994
Reviewer	Journal of Orthopaedic Research, since 1996
Reviewer	Annals of Biomedical Engineering, since 1996
Reviewer	Bone, since 1996
Reviewer	Journal of Bone and Mineral Research, since 1997
Reviewer	International Journal of Structures and Solids, since 1997
Member	Board of Editors, Journal of Medical Biomechanics, since 2002
Editor-in-Chief	Molecular and Cellular Biomechanics, 2005-2007
Managing Editor	Frontier in Bioscience, since 2006
Co-Editor-in-Chief	Founding Editor-in-Chief, Cellular and Molecular Bioengineering, an official and international journal Biomedical Engineering Society, 2007-2012
Associate Editor	Guest, Journal of Biomechanical Engineering, 2008-2009
Associate Editor	Journal of Biomechanical Engineering, 2009-2011

Associate Editor-in-Chief	Acta Mechanica Sinica, since 2008
International Editor	Journal of Orthopaedic Research, since 2014
Associate Editor	Journal of Bone and Mineral Research, since 2017
Panelist	Biomedical Engineering and Research to Aid Persons with Disabilities, Research Grant Review Panel, March 1999
Ad Hoc Member	Special Emphasis Study Section, NIAMS of National Institutes of Health, October 2000
Panelist	Biomedical Engineering and Research to Aid Persons with Disabilities, CAREER Panel, January 2001
Member	Peer Review Panel of American Institute of Biological Sciences, USAMRMC Bone Health and Military Medical Readiness 2001, February, 2001
Panelist	NASA Center Grant Review, February 19-20, 2002
Ad Hoc Member	Orthopaedics Study Section, NIAMS of National Institutes of Health, March 2002
Site-Visitor	NASA Center Grant Site Visit Team, May 28-31, 2002
Panelist	Special Grant Review Committee, NIDCR of National Institutes of Health, June 19, 2003
Panelist	Special Panel for Program Project Grant, NIAMS of National Institutes of Health, October 2003
Panelist	Special Grant Review Committee, NIDCR of National Institutes of Health, June 17, 2004
Panelist	Special Emphasis Panel on MABS, National Institutes of Health, June 24, 2004
Ad Hoc Member	Skeletal Biology Structure and Regeneration Study Section, NIAMS of National Institutes of Health, June 27-29, 2004
Panelist	Special Emphasis Panel, NIAMS of National Institutes of Health, December 14, 2004
Panelist	Special Emphasis Panel, NIAMS of National Institutes of Health, March 9, 2005
Panelist	Special Emphasis Panel, NIAMS of National Institutes of Health, April 8, 2005
Panelist	Special Emphasis Panel, NIAMS of National Institutes of Health, November 22, 2005
Standing Member	Skeletal Biology Structure and Regeneration Study Section, NIAMS of National Institutes of Health since February 2005-2009.
Member	External Advisory Committee, Institute of Biomechanics and Medical Engineering, Tsinghua University, Beijing, China, since 2006
Member	External Advisory Board, Department of Biomedical Engineering, University Alabama Birmingham, Birmingham, AL, since 2017
Member	External Advisory Board, Department of Biomedical Engineering, Binghamton University, Binghamton, NY, since 2017

Chair	International Advisory Board, School of Biological Science and Medical Engineering, Beijing University of Aeronautics and Astronautics, Beijing, China

Invited Lectures

January 1993	"Fatigue of Trabecular Bone", Department of Bioengineering The University of Utah, Salt Lake City, Utah
March 1993	"Fatigue of Trabecular Bone", Department of Mechanical Engineering Stanford University, Stanford, California
April 1993	"Fatigue of Trabecular Bone", Department of Mechanical Engineering The University of Pittsburgh, Pittsburgh, Pennsylvania
May 1993	"Fatigue of Trabecular Bone", Orthopaedic Research Laboratories Department of Surgery, The University of Michigan, Ann Arbor, Michigan
June 1993	"Fatigue of Trabecular Bone", Department of Orthopaedic Surgery State University of New York at Stony Brook, Stony Brook, New York
June 1993	"Fatigue of Trabecular Bone", Department of Mechanical Engineering Massachusetts Institute of Technology, Cambridge, Massachusetts
February 1994	"Fatigue of Trabecular Bone", Department of Biomedical Engineering Renssearlear Polytechnic Institute, Troy, New York
October 1994	"Quantification of Failure Mechanisms in Human Vertebral Trabecular Bone", Sibley School of Mechanical Engineering, Cornell University, Ithaca, New York
January 1995	"Quantification of Failure Mechanisms in Human Vertebral Trabecular Bone", Department of Orthopaedics, The New Jersey Medical and Dental School, Newark, New Jersey
October 1995	"Quantification of Failure Mechanisms in Human Vertebral Trabecular Bone", Department of Research, General Motors, Wayne, Michigan
January 1996	"Micromechanics of Cortical Bone Fracture", Department of Mechanical Engineering, Columbia University, New York, New York
January 1996	"Characterization of Localized Failure in Human Vertebral Trabecular Bone", Orthopaedic Research Laboratory, Department of Orthopaedic Surgery, Columbia University, New York, New York
October 1998	"Bone Biomechanics: From Cell to Whole Bone", Harvard-MIT Division of Health Science and Technology, Massachusetts Institute of Technology, Cambridge, Massachusetts
April 1999	"Bone Biomechanics: From Cell to Whole Bone", Department of Physics, The New Jersey Institute of Technology, Newark, New Jersey
April 2000	"Micromechanics of Cortical Bone", Department of Mechanical Engineering, The City College of the City University of New York, New York
August 2000	"Triphasic Analyses of Articular Cartilage", Department of Mechanical Engineering, Polytechnic University, Brooklyn, New York
October 2000	"Bone Biomechanics: From Cell to Whole Bone", Center for Bioengineering, Temple University, Philadelphia, Pennsylvania

July 2001	"Bone Biomechanics: From Cell to Whole Bone", Invited Speaker, 1st China-West Young Investigator Workshop on Biomechanics (sponsored jointly by National Science Foundation of China and National Science Foundation of the USA
October 2001	"Fluid Flow on Bone Cells: Influence of Flow-Cell-Substrate Interactions and Cell Mechanical Properties", Fluid Flow in Bone Workshop, Phoenix, Arizona
October 2001	"Trabecular Bone Formation by Mechanical and PTH Stimulation", NYC Mineralized Tissue Seminar, New York, New York
July 2002	"Trabecular Bone Formation by Mechanical and PTH Stimulation", 5th International Symposium on Bone Architecture and the Competence of Bone, Monterey, California
July 2002	"Biomechanics and Remodeling of Trabecular Bone", Departments of Bioengineering and Radiology, University of Pennsylvania, Philadelphia, Pennsylvania
September 2002	"Development of Biomedical Engineering Program at Columbia University, Department of Bioengineering, Beijing University of Astronautics and Aeronautics, Beijing, China
September 2002,	"Biomechanics and Remodeling of Trabecular Bone", Department of Bioengineering, Beijing University of Astronautics and Aeronautics, Beijing, China
September 2002	"Biomechanics and Remodeling of Trabecular Bone", Department of Orthopaedics, Shanghai Ninth People's Hospital, Second Medical University of Shanghai, Shanghai, China
September 2003	"Biomechanics and Mechanobiology of Bone", Department of Biomedical Engineering and Rehabilitation, Hong Kong Polytechnic University, Hong Kong, China
September 2003	"Biomechanics and Mechanobiology of Bone", Department of Orthopaedics, Hong Kong Chinese University, Hong Kong, China
September 2003	"Biomechanics and Mechanobiology of Bone", Department of Orthopaedics, Hong Kong University, Hong Kong, China
March 2004	"Biomechanics and Mechanobiology of Bone", Department of Radiology, University of Pennsylvania
June 2004	"Biomechanics and Mechanobiology of Bone", Department of Biological Engineering, Beijing University of Astronautics and Aeronautics, Beijing, China
July 2004	"Mechanobiology of Bone", Invited Speaker, 2nd China-West Young Investigator Workshop on Biomechanics (sponsored jointly by National Science Foundation of China and National Science Foundation of the USA
July 2004	"Biomechanics and Mechanobiology of Bone", Department of Orthopaedics, Shanghai Ninth People's Hospital, Second Medical University of Shanghai, Shanghai, China
July 2004	"Biomechanics and Mechanobiology of Bone", Department of Engineering Mechanics, Tsinghua University, Beijing, China

September 2004	"Biomechnobiology of Bone", Department of Biomedical Engineering, The State University of New York at Stony Brook, Stony Brook, New York
September 2004	"Mechanobiology of Bone", **Keynote Speaker**, 2nd World Congress of Chinese Biomedical Engineers, Beijing, China
November 2004	"Biomechanics and Mechanobiology of Bone", Department of Mechanical Engineering and Industrial Engineering, The University of Illinois at Urbana-Champaign, Champaign, Illinois
November 2004	"Mechanics and Mechanobiology of Bone", Department of Biomedical Engineering, Rensselaer Polytechnic Institute, Troy, New York
February 2005	"Mechanics and Mechanobiology of Bone", Department of Mechanical Engineering, the University of Texas at San Antonio, San Antonio, Texas
April 2005	"Mechanics and Mechanobiology of Bone", Department of Biomedical Engineering, Rochester University, Rochester, New York
May 2005	**Invited Speaker**, "The Role of Mechanical Force in Musculoskeletal Tissue Engineering", NIH Workshop on Tissue Engineering, Cambridge, Massachusetts
July 2005	"Mechanics and Mechanobiology of Bone", Department of Engineering Mechanics, Tsinghua University, Beijing, China
July 2005	"Mechanics and Mechanobiology of Bone", Department of Orthopaedic Surgery, Hong Kong University, Hong Kong, China
July 2005	"Mechanics and Mechanobiology of Bone", Department of Health Technology and Informatics, The Hong Kong Polytechnic University, Hong Kong, China
August 2005	"Mechanics and Mechanobiology of Bone", Institute of Mechanics, Chinese Academy of Science, Beijing, China
September 2005	"Substrate Modulation of Mechanotransduction in Bone Cells", Bone Fluid Workshop, New York, New York
December 2005	"Mechanics and Mechanobiology of Bone", **Plenary Speaker**, US-Thailand Symposium on Biomedical Engineering, Bangkok, Thailand
December 2005	"Micromechanics and Microfabrication Technologies in Mechanics and Mechanobiology of Bone", The US-China NSF Workshop of Young Investigator Awardees in Bio and Nano Mechanics and Materials, Sanya, Hainan Province, China
February 2006	"Mechanobiology of Bone", Gordon McKay Orthopaedic Research Laboratory, Department of Orthopaedic Surgery, University of Pennsylvania, Philadelphia, Pennsylvania
February 2006	"Mechanics of Osteoporotic Trabecular Bone", University of Pennsylvania Musculoskeletal Disorders Core Center Seminar Series
April 2006	"Mechanics and Mechanobiology of Bone", Department of Mechanical and Aerospace Engineering, Rutgers, the State University of New Jersey, Piscataway, New Jersey
April 2006	"An Overview of the Microstructure and Micro-Biomechanics of Bone Tissues" and "Mechanobiology of Bone", **Keynote Speaker**, Biomedical Engineering Workshop in Hong Kong

May 2006	**Invited Speaker**, Temporal Mandibular Joint Bioengineering Conference, Denver, Colorado
July 2006	**Plenary Speaker**, Cell and Tissue Engineering Workshop and Summer School, Serbia
September, 2006	"Mechanics and Mechanobiology of Bone", Department of Mechanical Engineering, University of Delaware, Newark, Delaware
December, 2006	"Mechanics and Mechanobiology of Bone", **Plenary Speaker**, 8th China National Conference of Biomechanics, Hong Kong, China
January, 2007	**Keynote Speaker**, 25th Annual Scientific Conference, The Society for Physical Regulation in Biology and Medicine, Honolulu Hawaii
January, 2007	"Mechanics and Mechanobiology of Bone", Department of Bioengineering, Pennsylvania State University, College Park, Pennsylvania
March, 2007	"Bone Bioengineering Research at Columbia", Merck, West Point, Pennsylvania
March, 2007	"Mechanics and Mechanobiology of Bone", Department of Electrical, Computer Engineering, University of Iowa, Iowa City, Iowa
July, 2007	**Keynote Speaker**, 3rd World Congress of Chinese Biomedical Engineers, Bangkok, Thailand
August, 2007	Chair and Invited Speaker, 3rd Sino-American Workshop on Biomechanics, Guanzhou, P. R. China
October, 2007	"Micromechanics of Human Trabecular Bone", Department of Biomedical Engineering, The City College of City University of New York, New York, New York.
November, 2007	"Mechanics and Mechanobiology of Bone", Department of Medicine, Columbia University, New York, New York.
November, 2007	Invited Participant, The National Academies Keck Futures Initiative, The Future of Human Healthspan: Demography, Evolution, Medicine, and Bioengineering conference, Irvine, California
March, 2008	Invited International Speaker, "Micromechanics of Human Trabecular Bone Failure", Fifth Clare Valley Bone Meeting, Clare Valley, South Australia
May, 2008	Invited Speaker, "Calcium Signaling in Bone Cell Network", 9th International Bone Fluid Workshop, Amsterdam, The Netherlands
July, 2008	Invited Speaker and Session Chair, "Nanomechanics in Bone Tissue Quality", Sun Valley Skeletal Biology Workshop, Sun Valley, ID
August, 2008	"Individual Trabeculae Segmentation Based Morphological and Finite Element Analyses of Human Trabecular Bone", School of Astronautics and Aeronautics, Tsinghua University, Beijing, P. R. China
August, 2008	"Individual Trabeculae Segmentation Based Morphological and Finite Element Analyses of Human Trabecular Bone", Institute of Mechanics, Chinese Academy of Sciences, Beijing, P. R. China
October, 2008	"Biomedical Engineering 20/20: Columbia University Experience", China-US Symposium on Global Biomedical Engineering Research and Education, Peking University, Beijing, P. R. China

October, 2008	"Individual Trabeculae Segmentation Based Morphological and Finite Element Analyses of Human Trabecular Bone", Beijing ICHTS - 2nd APBM Workshop on Bone Histomorphometry and Imaging, Beijing, P. R. China
October, 2008	"Individual Trabeculae Segmentation Based Morphological and Finite Element Analyses of Human Trabecular Bone", School of Astronautics and Aeronautics, Xian Jiaotong University, Xian, P. R. China
October, 2008	"Intracellular Calcium Waves in Osteocytic Network under Mechanical Loading: Implications in Mechanical Memory", Eastern Forum: Effects of Mechanical Environment and Sport Exercise on Metabolism, Repair, and Regeneration of Cartilage and Bone, Shanghai, P. R. China
February, 2009	"Can Images Predict Mechanical Competence in Patients?" Advanced Musculoskeletal Imaging Workshop by the International Society of Magnetic Resonance in Medicine, San Francisco, CA
April, 2009	"Osteocytic Network in Mechanical Memory of Bone Cells", Department of Bioengineering, University of Pittsburgh, PA
September, 2009	"Osteocytic Network in Mechanical Memory of Bone Cells", 10th International Bone Fluid Workshop, Hersey, PA
October, 2009	"Intracellular Calcium Waves in Osteocytic Network under Mechanical Loading: Implications in Mechanical Memory", College of Georgia, Augusta, GA
November, 2009	"Individual Trabeculae Segmentation Based Morphological and Finite Element Analyses of Human Trabecular Bone", ICHTS and CSORS Symposium on Musculoskeletal Research, Taipei, Taiwan
March, 2010	"Intracellular Calcium Waves in Osteocytic Network under Mechanical Loading: Implications in Mechanical Memory", Department of Biomedical Engineering, Purdue University, West Lafayette, IN
July, 2010	"Mechanobiology of Bone", Chinese National Natural Science Foundation Summer School in Nano and Biomechanics, Tsinghua University, Beijing, P. R. China
July, 2010	"Intracellular Calcium Waves in Osteocytic Network under Mechanical Loading: Implications in Mechanical Memory", International Symposium of Orthopaedic Biomechanics, Shanghai, P. R. China
July, 2010	"Intracellular Calcium Waves in Osteocytic Network under Mechanical Loading: Implications in Mechanical Memory", 4th Sino-American Workshop on Biomechanics, Chongqing, P. R. China
October, 2010	"Voltage-Sensitive Calcium Channels May Differentiate Intercellular Calcium Signaling between Osteocyte and Osteoblast Networks under Fluid Flow", International Bone Fluid Flow Workshop, Toronto
October, 2010	Keynote "Research from Good to Great, a Grapevine Concept", International Bone Fluid Flow Workshop, Toronto
May, 2011	Invited Speaker, 5th Shanghai International Congress on Orthopaedic Advanced Techniques and Clinical Translational Research, Shanghai, P. R. China
July, 2011	Founding Chair, Peking University Advanced Workshop on Biomechanics and Computational Medicine, (PKU BCM' 2011), Beijing, P. R. China

July, 2011	Invited Speaker, International Workshop on Biomechanics and Biomedical Engineering, Xian, P. R. China
August, 2011	Keynote Congress of Chinese Society for Theoretical and Applied Mechanics, Harbin, P. R. China
October, 2011	"Individual Trabecula Segmentation (ITS)-Based Morphological, Compositional, and Biomechanical Analyses of Human Trabecular Bone", Department of Mechanical Engineering, Cornell University
December, 2011	Keynote, Sixth International Congress of Chinese Orthopaedic Association (COA2011), Beijing, P. R. China
December, 2011	Invited Speaker, 1st CUHK International Symposium on Stem Cell Biology and Regenerative Medicine, Hong Kong, P. R. China
May, 2012	Invited Speaker, 6th Shanghai International Congress on Orthopaedic Advanced Techniques and Clinical Translational Research, Shanghai, P. R. China
August, 2012	Invited Speaker, Gordon Conference Musculoskeletal Biology & Bioengineering, Andover, NH
September, 2012	Plenary Speaker, 6th International Conference on Osteoporosis and Bone Mineral Research, Xian, P. R. China
October, 2012	Invited Speaker, 1st Annual Arnold and Madeline Penner Albert Einstein Skeletal Repair and Regeneration Conference, Albert Einstein College of Medicine, Bronx, NY
November, 2012	"Mechano-AND-Transduction in Osteocyte Network and Single Osteocyte", Department of Biomedical Engineering, Rensselaer Polytechnic Institute, Rensselaer, NY
November, 2012	Invited Speaker, 2nd Sino-America Workshop on Mechanobiology, Beihang University, Beijing, P. R. China
November, 2012	Keynote, Sixth International Congress of Chinese Orthopaedic Association (COA2012), Beijing, P. R. China
November, 2012	Invited Speaker, 2nd CUHK International Symposium on Stem Cell Biology and Regenerative Medicine, Hong Kong, P. R. China
May, 2013	Invited Speaker, AAOS-ORS Bone Quality and Fracture Prevention Symposium, Chicago, IL
May, 2013	Invited Speaker, ICMRS-ASBMR International Chinese Musculoskeletal Research Conference, Suzhou, P. R. China
May, 2013	Invited Speaker, 7th Shanghai International Congress on Orthopaedic Advanced Techniques and Clinical Translational Research, Shanghai, P. R. China
June, 2013	Invited Speaker, Inaugural International Biomedical Forum of West China, Shihezi, P. R. China
August, 2013	Invited Speaker, 5th Sino-American Workshop on Biomechanics, Beijing, P. R. China
October, 2013	Invited Speaker, 2nd Annual Arnold and Madeline Penner Albert Einstein Musculoskeletal Repair and Regeneration Symposium, Albert Einstein College of Medicine, Bronx, NY
December, 2013	Keynote Speaker, Biomedical and Bioengineering for Clinical Applications Symposium, Hong Kong

February, 2014	Invited Speaker, Department of Biomedical Engineering, Boston University, Boston, MA
April, 2014	Keynote Speaker, International Symposium of Space Biology and Biomedical Engineering, Xian, P. R. China
May, 2014	Chair and Organizer, NSF International Workshop on Multiscale Mechanobiology, Hong Kong, P. R. China
May, 2014	Invited Speaker, 8th Shanghai International Congress on Orthopaedic Advanced Techniques and Clinical Translational Research, Shanghai, P. R. China
June, 2014	Invited Speaker, 2nd International Biomedical Forum of West China, Shihezi, P. R. China
September, 2014	Invited Speaker, 20th International Bone Densitometry Workshop, Hong Kong, P. R. China
October, 2014	Invited Speaker, 3rd Annual Arnold and Madeline Penner Albert Einstein Musculoskeletal Repair and Regeneration Symposium, Albert Einstein College of Medicine, Bronx, NY
January, 2015	Avioli Musculoskeletal Seminar Speaker, Musculoskeletal Research Center, Washington University at St. Louis, St. Louis, MO
April, 2015	Invited Speaker, the 2nd International Chinese Musculoskeletal Research Conference, Changsha, Hunan Province, P. R. China
May, 2015	Organizer, Inaugural NSF-Columbia MechanoMedicine Symposium, Columbia University, New York, NY
May, 2015	Invited Speaker, 9th Shanghai International Congress on Orthopaedic Advanced Techniques and Clinical Translational Research, Shanghai, P. R. China
May, 2015	Invited Speaker, ICMRS Symposium at Kunming Medical University, Kunming, Yunnan, P. R. China
May, 2015	Invited Speaker, Department of Biomedical Engineering, the University of Texas at San Antonio, San Antonio, TX
May, 2015	Invited Speaker, Department of Bioengineering, the University of Maryland at College Park, College Park, MD
June, 2015	Invited Speaker, EULAR 2015 Annual Congress of the European League Against Rheumatism, Rome, Italy
June, 2015	Invited Speaker, 3nd International Biomedical Forum of West China, Shihezi, P. R. China
July, 2015	Invited Faculty Speaker, Peking University Advanced Workshop on Biomechanics and Computational Medicine, (PKU BCM' 2015), Beijing, P. R. China
August, 2015	Invited Speaker, School of Aerospace Engineering, Beijing Institute of Technology, Beijing, P. R. China
August, 2015	Invited Speaker, West China School of Stomatology, Sichuan University, Chengdu, Sichuan, P. R. China
October, 2015	Invited Speaker, South University of Science and Technology of China, Shenzhen, P. R. China
October, 2015	Invited Speaker, Department of Orthopaedics & Traumatology, Chinese University of Hong Kong, Hong Kong, P. R. China

October, 2015	Invited Speaker, 4th Annual Arnold and Madeline Penner Albert Einstein Musculoskeletal Repair and Regeneration Symposium, Albert Einstein College of Medicine, Bronx, NY
November, 2015	Invited Speaker, West China School of Stomatology, Sichuan University, Chengdu, Sichuan, P. R. China
November, 2015	Leader and Speaker, Beihang-Columbia Symposium on Biomedical Engineering, Beihang University, Beijing, P. R. China
March, 2016	Invited Speaker, South University of Science and Technology of China, Shenzhen, P. R. China
May, 2016	Invited Speaker, 10th Shanghai International Congress on Orthopaedic Advanced Techniques and Clinical Translational Research, Shanghai, P. R. China
July, 2016	Invited Speaker, Sino-US Workshop on Biomechanics
May, 2016	Invited Speaker, ICMRS Taipei, Republic of China
October, 2016	Invited Speaker, 4th Annual Arnold and Madeline Penner Albert Einstein Musculoskeletal Repair and Regeneration Symposium, Albert Einstein College of Medicine, Bronx, NY
November, 2016	Invited Speaker, International Chinese Musculoskeletal Research Conference, Chongqing, P. R. China
November, 2016	Organizers, SUSTech-Columbia Symposium on Biomedical Engineering, Shenzhen, P. R. China
May, 2017	Invited Speaker, 11th Shanghai International Congress on Orthopaedic Advanced Techniques and Clinical Translational Research, Shanghai, P. R. China
October, 2017	Invited Speaker, 5th Annual Arnold and Madeline Penner Albert Einstein Musculoskeletal Repair and Regeneration Symposium, Albert Einstein College of Medicine, Bronx, NY
January, 2018	Invited Speaker, Department of Biomedical Engineering, University of Texas San Antonio, San Antonio, TX
February, 2018	Invited Speaker, Department of Biomedical Engineering, University of Alabama at Birmingham, Birmingham, AL
June, 2018	Invited Speaker, The IUTAM Symposium on Mechanical Environments of Living Cells, Xian Jiaotong Univeristy, Xian, Shanxi, China
July, 2018	Keynote Speaker, 8th, World Congress of Biomechanics, Dublin, Ireland

D. Teaching Experience

Courses Taught

1991	Teaching Fellow for undergraduate engineering science course "**Advanced Applied Mathematics**" Harvard University
1992	Teaching Fellow for graduate biomedical engineering course "**Muscles, Reflexes and Locomotion**" Harvard University
1992	Teaching Fellow for graduate biomedical engineering course "**Systems Analysis with Physiological Applications**" Harvard University
1992	Teaching Fellow for graduate biomedical engineering course

"**Fluid Flow in the Human Body**" Harvard University

1996 Instructor, "**Orthopaedic Biomechanics**" The University of Michigan

1996 Instructor, MECE E4701 "**Introductory Biomechanics**"
(Enrollment: 12 students)

1997 Instructor, BMEN E4301 "**Structure, Adaptation and Mechanics of Bone**"
(Enrollment: 15 students)

1997 Section Instructor, BMEN E3840 "**Biomedical Engineering Laboratory**"
(Enrollment: 9 students)

1997 Instructor, MECE-BMEN E4702 "**Advanced Musculoskeletal Biomechanics**"
(Enrollment: 12 students)

1997 Instructor, ENME-MECE E3105 "**Mechanics**"
(Enrollment: 39 students)

1998 Instructor, MECE E3409 "**Computer Aid Design**"
(Enrollment: 17 students)

1998 Section Instructor, BMEN E3840 "**Biomedical Engineering Laboratory**"
(Enrollment: 15 students)

1998 Section Instructor, BMEN E3910 "**Biomedical Engineering Design**"
(Enrollment: 15 students)

1999 Instructor, BMEN E3310 **"Tissue Mechanics"**
(Enrollment: 10 students)

1999 Section Instructor, BMEN E3910 "**Biomedical Engineering Design**"
(Enrollment: 23 students)

1999 Instructor, MECE-BMEN E4702 "**Advanced Musculoskeletal Biomechanics**"
(Enrollment: 18 students)

2000 Instructor, BMEN E3002 **"Biomedical Engineering Principles II"**
(Enrollment: 40 students)

2000 Director, BMEN E3820 **"Biomedical Engineering Laboratory II"**
(Enrollment: 40 students)

2000 Section Instructor, BMEN E3840 **"Biomedical Engineering Laboratory IV"**
(Enrollment: 25 students)

2000 Director, BMEN E3810 **"Biomedical Engineering Laboratory I"**
(Enrollment: 35 students)

2001 Instructor, BMEN E3002 **"Quantitative Physiology II"**
(Enrollment 39 students)

2001 Instructor, BMEN E6301 **"Analysis of Biological Tissues with FE"**
(Enrollment 9 students)

2001 Instructor, MEBM E4702**"Advanced Musculoskeletal Biomechanics"**
(Enrollment 15 students)

2001 Section Instructor, BMEN E3810 **"Biomedical Engineering Laboratory I"**
(Enrollment 40 students)

2002 Instructor, BMEN E3002 **"Quantitative Physiology II"**
(Enrollment 39 students)

2002 Instructor, BMEN E4301 **"Structure, Mechanics, Adaptation of Bone"**
(Enrollment 23 students)

2002 Section Instructor, BMEN E3830 **"Biomedical Engineering Laboratory III"**
(Enrollment 44 students)

2003 Instructor, BMEN 3310 **“Solid Biomechanics”**
(Enrollment 14 students)
2004 Instructor, BMEN E4301 **“Structure, Mechanics, Adaptation of Bone”**
(Enrollment 25 students)
2005 Instructor, BMEN 4300 **“Solid Biomechanics”**
(Enrollment 21 students)
2006 Instructor, BMEN 4300 **“Solid Biomechanics”**
(Enrollment 27 students)
2007 Instructor, BMEN E6301 **“Analysis of Biological Tissues with FE”**
2008 Instructor, BMEN E3820 **“Biomedical Engineering Laboratory II”**
2010 Instructor, BMEN 4300 **“Solid Biomechanics”**
(Enrollment 17 students)
2010 Instructor, BMME 4701 **“Advanced Musculoskeletal Biomechanics”**
(Enrollment 11 students)
2011 Instructor, BMEN E4301 **“Structure, Mechanics, Adaptation of Bone”**
(Enrollment 27)
2012 Instructor, BMME 4701 **“Advanced Musculoskeletal Biomechanics”**
(Enrollment 12)
2013 Instructor, BMEN E4300 **“Solid Biomechanics”**
(Enrollment 21)
2013 Instructor, BMEN E4301 **“Structure, Mechanics, Adaptation of Bone”**
(Enrollment 15)
2014 Instructor, BMEN E4300 **“Solid Biomechanics”**
(Enrollment 23)
2015 Instructor, BMEN E4300 **“Solid Biomechanics”**
(Enrollment 27)
2015 Instructor, BMEN E3010 **“Biomedical Engineering I”**
(Enrollment 48)
2016 Instructor, BMEN E4310 **“Solid Biomechanics”**
(Enrollment 25)
2016 Instructor, BMEN E3010 **“Biomedical Engineering I”**
(Enrollment 48)
2016 Instructor, BMEN E4320 **“Fluid Biomechanics”**
(Enrollment 4)
2016 Instructor, BMEN E4320 **“Fluid Biomechanics”**
(Enrollment 12)
2017 Instructor, BMEN E4310 **“Solid Biomechanics”**
(Enrollment 15)
2017 Instructor, BMEN E3010 **“Biomedical Engineering I”**
(Enrollment 48)
2018 Instructor, BMEN E4310 **“Solid Biomechanics”**
(Enrollment 15)

Student Supervision

Undergraduate Student

Christopher J. Bailey	Research Adviser, Orthopaedic Research Laboratories, The University of Michigan
Keith Chan	Research Adviser, Department of Biomedical Engineering, Columbia University
Erica Takai	Research Adviser, Department of Biomedical Engineering, Columbia University
Daniel Ginat	Research Adviser, Department of Biomedical Engineering, Columbia University
George Mikhail	Research Adviser, Department of Biomedical Engineering, Columbia University
Jeffrey Shyu	Research Adviser, Department of Biomedical Engineering, Columbia University
Priya Raina	Research Adviser, Department of Biomedical Engineering, Columbia University
Michelle Huang	Research Adviser, Department of Biomedical Engineering, Columbia University
Garrett Kinnebrew	Research Adviser, Department of Biomedical Engineering, Columbia University
Frank Yuan	Research Adviser of Summer Research, Department of Biomedical Engineering, Johns Hopkins University
Angela Huang	Research Adviser, Department of Biomedical Engineering, Columbia University
Judith Green	Research Adviser, Department of Biomedical Engineering, Columbia University
Meghan Jewitt	Research Adviser, Department of Biomedical Engineering, Columbia University
Victor Chiang	Research Adviser, Department of Biomedical Engineering, Columbia University
Perry Yin	Research Adviser, Department of Biomedical Engineering, Columbia University
Jiasi Chen	Research Adviser, Department of Biomedical Engineering, Columbia University
Kiranjit Sekhon	Summer Research Adviser, Department of Bioengineering, University of California at Berkeley
Sonia Bansal	Research Adviser, Department of Biomedical Engineering, Columbia University
Genya Gurvich	Research Adviser, Brown University
Kaman Chan	Research Adviser, Chinese University of Hong Kong
Liliana Law	Research Adviser, Chinese University of Hong Kong
Lizzie Cheong	Research Adviser, Chinese University of Hong Kong
Shirley Wu	Research Adviser, Chinese University of Hong Kong
Annabelle Chu	Research Adviser, Department of Biomedical Engineering, Columbia University
Susan Rodriguez	Research Adviser, Department of Biomedical Engineering, Columbia University

William Smith	Research Adviser, Department of Biomedical Engineering, Columbia University
Philip Lee	Research Adviser, Department of Biomedical Engineering, Columbia University
Sophie Jo	Research Adviser, Department of Biomedical Engineering, Columbia University

Master Student

David E. Weismann	Research Adviser, Orthopaedic Research Laboratories, The University of Michigan
Erica A. Smith	Research Adviser, Orthopaedic Research Laboratories, The University of Michigan
Juan M. Taboas	Research Adviser, Orthopaedic Research Laboratories, The University of Michigan
Eben Alsberg	Research adviser, Orthopaedic Research Laboratories, The University of Michigan
Chi Hyun Kim	Research Adviser, Department of Biomedical Engineering, Columbia University
Mark J. Eichler	Research Adviser, Department of Biomedical Engineering, Columbia University
Erica Takai	Research Adviser, Department of Biomedical Engineering, Columbia University
Liling Wei	Research Adviser, Department of Biomedical Engineering, Columbia University
Erin Gulczynski	Research Adviser, Department of Biomedical Engineering, Columbia University
Mei Lin Ete Chan	Research Adviser, Department of Biomedical Engineering, Columbia University
Xiaowei Liu	Research Adviser, Department of Biomedical Engineering, Columbia University
Andrew Baik	Research Adviser, Department of Biomedical Engineering, Columbia University
Miri Park	Research Adviser, Department of Biomedical Engineering, Columbia University
Ji Wang	Research Adviser, Department of Biomedical Engineering, Columbia University
Genevieve Brown	Research Adviser, Department of Biomedical Engineering, Columbia University
Xiangyu Will Gu	Research Adviser, Department of Biomedical Engineering, Columbia University
Andrea Morrell	Research Adviser, Department of Biomedical Engineering, Columbia University
Samuel Robinson	Research Adviser, Department of Biomedical Engineering, Columbia University
Nicolas Chatel	Research Adviser, EPFL, Switzerland

Prajesh Desai	Research Adviser, Department of Biomedical Engineering, Columbia University
Jules Scogna	Research Adviser, Department of Biomedical Engineering, Columbia University
Zac Sarich	Research Adviser, Department of Biomedical Engineering, Columbia University
Zhengdong Zhang	Research Adviser, Shihezi University, Xinjiang, China

Doctoral Student

X. Neil Dong	Doctoral Thesis Adviser, Department of Mechanical Engineering, Columbia University 2002 "Micromechanics of Osteonal Cortical Bone"
Chi Hyun Kim	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University "Trabecular Bone Response to Combined PTH and Mechanical Stimulation" 2003
Erica Takai	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2005 "Modulation of Mechanotransduction in Bone Cells"
Xiaowei Sherry Liu	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2007 "High Resolution Image Based Micro-Mechanical Modeling of Trabecular Bone"
Mei Lin Ete Chan	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2009 "Mechanobiology of 3D Co-Culture of Trabecular Bone Explant Model"
Xiaohui Zhang	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2009 "High Resolution Imaging Based Patient Specific Biomechanical Assessment of Bone Quality"
Andrew Baik	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2012 **"**Application of a Novel Quasi-3D Microscopy Technique to Investigate Early Osteocyte Mechanotransduction Events"
Hong Wang	Doctoral Thesis Co-Adviser, Department of Engineering Mechanics, Tsinghua University, Beijing, P. R. China 2012
Jun Qiu	Doctoral Thesis Co-Adviser, Department of Engineering Mechanics, Tsinghua University, Beijing, P. R. China 2012
Da Jing	Doctoral Thesis Co-Adviser, Department of Biomedical Engineering, 4th Military Medical University, Xian, P. R, China 2013
Bin Zhou	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2014

	"Bone Quality Assessment Using Resolution Peripheral Quantitative Computed Tomography HR-pQCT"
Ji Wang	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2016 **"**Plate-Rod Microstructural Modeling for Accurate and Fast Assessment of Bone Strength"
Genevieve Brown	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2016 "The Sustainment and Consequences of Cytosolic Calcium Signals in Osteocytes"
Yue Eric Yu	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University 2016 "Contributions of anisotropic and heterogeneous tissue modulus to apparent trabecular bone mechanical properties"
Andrea Morrell	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University (in progress)
Samuel Robinson	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University (in progress)
Yizhong Jenny Hu	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University (in progress)
Andreea Dinescu	Doctoral Thesis Adviser, Department of Biomedical Engineering, Columbia University (in progress)
Wenchuan Li	Examiner for Ph.D. Thesis Defense, Department of Mechanical Engineering, Columbia University "Numerical and experimental investigations of laser forming processes" (Professor Y. Larry Yao, Thesis Adviser)
Liangfeng Xu	Examiner for Ph.D. Thesis Defense, Department of Mechanical Engineering, Columbia University "Biomechanics of the Thumb Carpometacarpal Joint: Topography, Ligamentous Structure, Articular Contact, and Kinematics" (Professors Van C. Mow and Gerard Ateshian, Thesis Advisers)
Guoyu Yang	Examiner for Ph.D. Thesis Proposal, Department of Mechanical Engineering, The City College of The City University of New York "A New Method for the Analysis of the Dependence of Elastic Constants of Cancellous Bone Upon Volume Fraction" (Professor Stephen C. Cowin, Thesis Adviser)
Guoyu Yang	Examiner for Ph.D. Thesis Defense, Department of Mechanical Engineering, The City College of The City University of New York "Averaging and Bounding of Anisotropic Elastic Constants" (Professor Stephen C. Cowin, Thesis Adviser)

Lixun Sun	Examiner for Ph.D. Thesis Defense, Department of Civil Engineering and Engineering Mechanics, Columbia University "Centrifuge Modeling and Finite Element Analysis of Pipeline Buried in Liquefiable Soil (Professor Hoe I. Ling, Thesis Adviser)
Dongning D. Sun	Examiner for Ph.D. Thesis Defense, Department of Mechanical Engineering, Columbia University "Theoretical and Experimental Investigations of the Mechano-Electrochemical Properties of Articular Cartilage, a Charged-Hydrated-Soft, Biological Tissue" (Professors Van C. Mow and W. Mike Lai, Thesis Advisers)
Changbin C. Wang	Examiner for Ph.D. Thesis Defense, Department of Mechanical Engineering, Columbia University "Digital Video Microscopy-Based Determination of Cartilage Inhomogeneity, Anisotropy and Tension-Compression Nonlinearity: Implications on Chondrocyte Environment" (Professors Clark T. Hung, Van C. Mow and Gerard Ateshian, Thesis Advisers)
Huabei Liu	Examiner for Ph.D. Thesis Defense, Department of Civil Engineering and Engineering Mechanics, Columbia University "Finite Element Simulation of the Response of Geosynthetic-Reinforced Soil Walls" (Professor Hoe I. Ling, Thesis Adviser)
Russell A. Garman	External Examiner for Ph.D. Defense, Department of Biomedical Engineering, Stony Brook University, "Low-level Accelerations Applied in the Absence of Weight Bearing Can Alter Cellular Activity and Tissue Morphology in the Skeleton" (Professor Stefan Judex, Thesis Adviser)
Ines Basalo	Examiner for Ph.D. Thesis Defense, Department of Mechanical Engineering, Columbia University (Professor Gerard Ateshian, Thesis Adviser)
Nadeen O. Chahine	Chair, Ph.D. Thesis Defense, "Multi-Scale Measurements of the Mechanical and Transport Properties of Native and Engineered Articular Cartilage" (Professors Gerard Ateshian and Clark T. Hung, Thesis Advisers)
Guoxin Ni	External Examiner for Ph.D. Defense, Department of Orthopaedics and Traumatology, Hong Kong University (Professor William Lu, Thesis Adviser)
Xin Lux Lu	Chair, Ph.D. Thesis Defense, Department of Biomedical Engineering, Columbia University, "Indentation Analysis of Articular Cartilage Using the Triphasic Mixture Theory" (Professor Van C. Mow, Thesis Adviser)
Morakot Likhitpanichkul	Examiner, Ph.D. Thesis Defense, Department of Mechanical Engineering, Columbia University (Professor Van C. Mow, Thesis Adviser)
Leo Q. Wan	Chair, Ph.D. Thesis Defense, Department of Biomedical Engineering, (Professor Van C. Mow, Thesis Adviser)

Postdoctoral Fellows

Xiaoliang Leon Xu, **Bo Bob Huo**, **Xing Lucas Lu, Xiaowei Sherry Liu, Guoguang Fu, Qida Liu, Xiutao Tony Shi, Isabel Leung, Xiang Ian Gu, Andrew Baik**

E. Publications

Full Length Paper

1. **Guo, X.** and Wu, W-Y (1987) The Stokes Flow Produced by An Arbitrary Axisymmetric Oblate Body Moving Perpendicularly Toward An Infinite Flat Wall Along Its Minor Axis, *Acta Scientiarum Naturalium Universitatis Pekinensis*, **1**:39-48.
2. **Guo, X.** and Wu, W-Y (1988) An Approach to the Mathematical Modeling of the Pulse Condition-the Displacement Wave, *(Chinese) Journal of Biomechanics*, **3**(1):21-26.
3. **Guo, X.** and Wu, W-Y (1988) The Mathematical and Mechanical Models in Biomechanics of the Spine: Review, *Foreign Medicine: Biomedical Engineering* (P. R. China), **11**(6):296-301.
4. Wu, W-Y, Liang, L. and **Guo, X**. (1990) The Mixed Finite Element Method for Axisymmetric Stokes Flow on the Unbounded Domains. *Chinese Journal of Computational Physics*, **7**(3):294-302.
5. **Guo, X.** and Wu, W-Y (1991) Mechanical Analysis of Correction of Scoliosis by Means of Shape Memory Alloy Rods --- Simple Mathematical and Mechanical Model, *Chinese Journal of Biomedical Engineering*, **10**(2):87-93.
6. **Guo, X. D.** and Cowin, S. C. (1992) Periosteal and Endosteal Control of Bone Remodeling Under Torsional Loading, *J. Biomechanics*, **25(6)**: 645-650.
7. Michel, M. C., **Guo, X. D.**, Gibson, L. J., McMahon, T. A., and Hayes, W. C. (1993) Compressive Fatigue Behavior of Bovine Trabecular Bone, *J. Biomechanics*, **26(4-5)**: 453-463.
8. **Guo, X. E.**, Gibson, L. J., McMahon, T. A., Keaveny, T. M. and Hayes, W. C. (1994) Finite Element Modeling of Damage Accumulation in Trabecular Bone Under Cyclic Loading, *J. Biomechanics*, **27(2)**: 145-155.
9. Keaveny, T. M., **Guo, X. E.**, Watchtel, E. F., McMahon, T. A. and Hayes, W. C. (1994) Trabecular Bone Exhibits Fully Linear Elastic Behavior and Yields at Low Strains, *J. Biomechanics*, **27(9)**: 1127-1136.
10. Keaveny, T. M., Watchtel, E. F., **Guo, X. E.**, and Hayes, W. C. (1994) The Mechanical Properties of Damaged Trabecular Bone, *J. Biomechanics*, **27(9)**: 1309-1318.
11. Gulberg, R. E., Caldwell, N. J., **Guo, X. E.**, Goulet, R. W., Hollister, S. J., and Goldstein, S. A. (1997) Mechanical Stimulation of Tissue Repair in the Hydraulic Bone Chamber, *J. Bone Miner. Res.*, **12(8)**: 1295-1302.
12. **Guo, X. E.** and Goldstein, S. A. (1997) Is trabecular Bone Tissue Different from Cortical Bone Tissue? *Forma*, **12**:185-196.
13. **Guo, X. E.**, Liang, L. C., and Goldstein, S. A. (1998) Micromechanics of osteonal cortical bone fracture, *J. Biomech. Eng.*, **120(1)**:112-117.
14. Bowman, S. M., **Guo, X. E.**, Cheng, D. W., Keaveny, T. M., Gibson, L. J., Hayes, W. C., and McMahon, T. A. (1998) Creep Contributes to the Fatigue Behavior of Bovine Trabecular Bone, *J. Biomech. Eng.*, **120(5)**: 647-654.
15. **Guo, X. E.**, and Gibson, L. J. (1999) Behavior of Intact and Damaged Honeycombs: A Finite Element Study, *Intl. J. Mech. Sci*., **41(1)**: 85-105.

16. Zysset, P.K., **Guo, X.E.**, Hoffler, C.E., Moore, K.E., and Goldstein S.A. (1998) Mechanical properties of human trabecular bone lamellae quantified by nanoindentation, *Technology and Health Care*, **6(5)**: 429-432.
17. Sun, D. N., Gu, W. Y., **Guo, X. E.**, Lai, W. M., and Mow, V. C. (1999) A Mixed Finite Element Formulation of Triphasic Mechano-electrochemical Theory for Charged, Hydrated Biological Soft Tissues, *Int. J. Num. Methods Eng.*, **45(10)**: 1375-1402.
18. Zysset, P. K., **Guo, X. E.**, Hoffler, C. E., Moore, K. E., and Goldstein, S. A. (1999) Elastic Modulus and Hardness of Cortical and Trabecular Bone Lamella Measured by Nanoidentation in the human femur, *J. Biomech.*, **32(10)**:1005-1012.
19. **Guo, X. E.** and Goldstein, S. A. (2000) Vertebral Trabecular Bone Microscopic Tissue Elastic Modulus and Hardness Do Not Change in Ovarietomized Rats, *J. Orthop. Res.*, **18(2)**: 333-336.
20. Schaffner, G., **Guo, XD. E.**, Silva, M. J. and Gibson, L. J. (2000) Modeling Fatigue Damage Accumulation in Two-Dimensional Voronoi Honeycombs, *Intl. J. Mech. Sci*., **42(4)**: 645-656.
21. **Guo, X. E.**, and Kim, C. H. (2002) Mechanical Consequence of Trabecular Bone Loss and Its Treatment: A Three-Dimensional Model Stimulation, *Bone*, **30(2)**: 404-411.
22. **Guo, X. E.**, Eichler, M. J., Takai, E. and Kim, C. H. (2002) A Rat Tail Vertebrae Model for Trabecular Bone Adaptation Studies, *J. Biomech*. **35(3)**: 363-368.
23. Lai, W. M., Sun, D. D., Ateshian, G. A., **Guo, X. E**., and Mow, V. M. (2002) Electrical Signals for Chondrocytes in Cartilage, *Biorheology*, **39(1/2)**: 11-25.
24. Wang, C. C., **Guo, X. E**., Sun, D., Mow, V. C., Ateshian, G. A., and Hung, C. T. (2002) The Functional Environment of Chondrocytes within Cartilage Subjected to Compressive Loading: Theoretical and Experimental Approach, *Biorheology*, **39(1/2)**: 39-45.
25. Mow, V. C. and **Guo, X. E.** (2002) Mechano-Electrochemical Properties of Articular Cartilage: Their Inhomogeneities and Anisotropies, *Annual Review in Biomedical Engineering*, **4**:175-209.
26. Kim, C. H., Takai, E., Zhou, H., von Stechow, D., Müller, R., Dempster, D. W., and **Guo, X. E.** (2003) Trabecular Bone Response to Mechanical and Parathyroid Hormone Stimulation: The Role of Mechanical Microenvironments, *J. Bone and Miner. Res.*, **18(12)**: 2116-2125.
27. Hung, C. T., Lima, E G., Mauck, R. L., Takai, E., LeRoux, M. A., Lu, H. H., Stark, R. G., **Guo, X. E.**, and Ateshian, G. A. (2003) Anatomically Shaped Osteochondral Constructs for Articular Cartilage Repair, *J. Biomemch*., **36(12)**:1853-1864.
28. Chua, S. C. Jr., Liu, S. M., Li, Q., Sun, A., DeNino, W. F., Heymsfield, S. B., and **Guo, X. E.** (2004) Transgenic Complementation of Leptin Receptor Deficiency. II. Increased Leptin Receptor Transgene Dose Effects on Obesity/diabetes and Fertility/lactation in Lepr-db/db mice, *Am. J. Physiol. Endocrinol. Metab*., **286(3)**:E384-392.
29. Sun, D. D., **Guo, X. E.**, Likhitpanichkul, M., Lai, W. M., and Mow, V.C. (2004) The Influence of the Fixed Negative Charges on Mechanical and Electrical Behaviors of Articular Cartilage under Unconfined Compression, *ASME J Biomech. Eng.*, **126(1)**:6-16.

30. Lu, X. L., Sun, D. D., **Guo, X. E.**, Chen, F. H., Lai, W. M., and Mow, V. C. (2004) Indentation Determined Mechanoelectrochemical Properties and Fixed Charge Density of Articular Cartilage, *Ann. Biomed. Eng*. **32(3)**: 370-379.
31. Wan, L. Q., Miller, C., **Guo, X. E**., and Mow, V. C. (2004) Fixed Electrical Charges and Mobile Ions Affect the Measurable Mechano-Electrochemical Properties of Charged-Hydrated Biological Tissues: The Articular Cartilage Paradigm, *Mechanics and Chemistry of Biosystems*, **1(1)**:81-99.
32. Dong, X. N. and **Guo, X. E.** (2004) The dependence of transversely isotropic elasticity of human femoral cortical bone on porosity, *J. Biomech*., **37**:1281-2187.
33. Takai, E., Mauck, R. L., Hung, C. T. and **Guo, X. E.** (2004) Osteocyte Viability and Regulation of Osteoblast Function in a 3D Trabecular Bone Explant under Dynamic Hydrostatic Pressure, *Journal of Bone and Mineral Research*, **19(9)**:1403-1410.
34. Dong, X. N. and **Guo, X. E.** (2004) Geometric Determinants to Cement Line Debonding and Osteonal Lamellae Failure in Osteon Pushout Tests, *ASME J. Biomech. Eng*., **126(3)**:387-390.
35. Dong, X. N., Zhang, X. H., Huang, Y. Y., and **Guo, X. E**. (2005) A Generalized Self-consistent Estimate for the Effective Elastic Moduli of Fiber-reinforced Composite Materials with Multiple Transversely Isotropic Inclusions, *Int. J. Mech. Sc.*, **47(6)**: 922–940.
36. Takai, E., Costa, K. D., Shaheen, A., Hung, C. T., and **Guo, X. E.** (2005) Osteoblast Elastic Modulus Measured by Atomic Force Microscopy is Substrate Dependent, *Annals of Biomedical Engineering*, **33(7)**:963–971. (Cover Picture)
37. Dong, X. N., Zhang, X., and **Guo, X. E.** (2005) Interfacial Strength of Cement Lines in Human Cortical Bone, *Mechanics and Chemistry of Biosystems*, **2(2)**:63-68.
38. Lu, H. H., Jiang, J., Tang, A., Hung, C. T., and **Guo, X. E.** (2005) Development of Controlled Heterogeneityy on a Polymer-Ceramic Hydrogel Scaffold for Osteocondral Repair, *Key Engineering Materials*, **284-286**:607-610.
39. Xu, X. L., Tang, T., Dai, K., Zhu, Z., **Guo, X. E.**, Yu, C., Lou, J. (2005) Immune Response and Effect of Adenovirus-mediated Human BMP-2 Gene Transfer on the Repair of Segmental Tibial Bone Defects in Goats, *Acta Orthopaedica*, **76(5)**:637-646.
40. Hoffler, C. E., **Guo, X. E.**, Zysset, P. K., and Goldstein, S. A. (2005) An Application of Nanoindentation Technique to Measure Bone Tissue Lamellae Properties, *ASME J. Biomech. Eng.*, **127(7)**:1046-1053.
41. Likhitpanichkul, M., **Guo, X. E.**, and Mow, V. C. (2005) The Effect of Matrix Tension-Comprression Nonlinearity and Fixed Charges on Chondrocyte Response in Cartilage, *Molecular and Cellular Biomechanics*, **2(4)**:191-204.
42. Takai, E., Landersberg, R., Katz, R. W., Hung, C. T., and **Guo, X. E.** (2006) Substrate modulation of Osteoblast Cell Adhesion Strength, Focal Adhesion Kinase Activation, and Responsiveness to Mechanical Stimuli, *Molecular and Cellular Biomechanics*, **3(1)**:1-12.
43. Dong, X. N., and **Guo, X. E.** (2006) Prediction of Cortical Bone Elastic Constants by A Two-Level Micromechanical Model Using A Generalized Self-Consistent Method, *ASME Journal of Biomechanical Engineering*, **128(3)**:309-316.

44. Ishii, Y., Thomas, A. O., **Guo, X. E.**, Hung, C. T., and Chen, F. H. (2006) Localization and Distribution of Cartilage Oligomeric Matrix Protein in the Rat Intervertebral Disc, *Spine*, **31(14)**: 1539-1546.
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188. Shi, X. T., Zhou, B., Adams, M. F., and **Guo, X. E.** Boundary Conditions in Nonlinear μCT Image Based Finite Element Modeling Do Not Affect Predictions in Yield Strength of Human Trabecular Bone, 58th Annual Meeting of the Orthopaedic

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189. Jing, D., Leong, P. I., Chiang, V. C., Sajda, P., and **Guo, X. E.** Automatic Extraction and Analysis of Calcium Signaling in Bone Cell Network, 58th Annual Meeting of the Orthopaedic Research Society, San Francisco, California, February 4 - 7, 2012.
190. Ural, A., Zhou, B., Shi, X. T., Shane, E., and **Guo, X. E.** Evaluation of Distal Forearm Fracture Risk Using HR-pQCT Imaging and Cohesive Finite Element Modeling, 58th Annual Meeting of the Orthopaedic Research Society, San Francisco, California, February 4 - 7, 2012.
191. Ural, A., Bruno, P., Zhou, B., Shi, X. T., Shane, E., and **Guo, X. E.**, A Combined HR-pQCT and Fracture Mechanics-Based Finite Element Approach for Fracture Risk Assessment of Human Radius, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
192. Wang, J., Zhou, B., Liu, X. S., Shi, X. T., Stein, E., Shane, E., and **Guo, X. E.** Accurate and Fast Strength Predictions of Patient-specific HR-pQCT-based plate-rod Models Distinguish Women with Vertebral Fractures, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
193. Stein, E., Carrelli, A., Young, P., Bucovsky, M., McMahon, D., Zhang, C., Zhou, B., Wang, J., **Guo, X. E.**, Shane, E., and Silverberg, S. Bone Loss After Bariatric Surgery: Not Just Skeletal Unloading, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
194. Stein, E., Liu, X. S., Nickolas, T. L., Cohen, A., Kepley, A., **Guo, X. E.**, and Shane, E. Postmenopausal Women with Osteopenia and Fractures Have Thin Cortices and Trabecular Plate Loss, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
195. Nickolas, T., Stein, E., Zhang, C., Cremers, S., Boutroy, S., Liu, X., McMahon, D., Leonard, M., **Guo, X.**, and Shane, E. Rapid Cortical Bone Loss in Patients with Chronic Kidney Disease, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
196. Shi, X. T., Zhou, B., Wang, J., **Guo, X.**, Differences in Mineralization between Cortical and Trabecular Bone in Human Proximal Femur, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
197. Wang, J., Kazakia, G., Zhou, B., Shi, X. T., and **Guo, X.**, Distinct tissue mineral density (TMD) distribution in human trabecular plates and rods, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
198. Iyer, S., Nikkel, L., Zhang, C., McMahon. D., Boutroy, S., Liu, X., **Guo, X.**, Majumdar, S., Wojciechowski, D., Shane, E., Nickolas, T., Early Corticosteroid Withdrawal after Kidney Transplantation: Paradoxical Effects on the Central and Peripheral Skeleton, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
199. Zhou, B., Wang, J., Parkinson, I., Liu, X., Thomas, T. L., Clement, HJ. G., Fazzalari, N., and **Guo, X.,** Losing Trabecular Plates and Axial BV/TV in Hip Fractures, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.

200. Sun, W., Rajapakse, C., **Guo, X.** and Wehrli, F. W., Mechanical Implications of Subtle Changes in Trabecular Bone Estimated by MRI-Based Finite Element Modeling, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
201. Jing, D., Zhou, B., Lu, X. L., Wang, L., **Guo, X**., Observing In Situ Intracellular Calcium Signaling of Osteocytes and Osteoblasts in Intact Mouse Tibiae under Cyclic Mechanical Loading, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
202. Rajapakse, C., Phillips, E., Sun, W., Wald, M., Snyder, P., **Guo, X**., and Wehrli, F. W., Vertebral Deformity Fracture Number and Severity are Associated with Mechanical Competence at Peripheral Bone Derived by Micro-MRI Based Biomechanics, Annual Meeting of the American Society for Bone and Mineral Research, Minneapolis, Minnesota, October 12-15, 2012.
203. D. Jing, B. Zhou, X. Lu, L. Wang, **X. G**uo, Ex Vivo Calcium Response of Osteocytes and Osteoblasts in Intact Mouse Tibiae under Cyclic Mechanical Loading, 59th Annual Meeting of the Orthopaedic Research Society, San Antonio, Texas, January 26-27th, 2013.
204. N. Khanarian, M. Boushell, **X. Guo**, S. Doty, E. Strauss, E. Hunziker, H. Lu, Design of Hydrogel-Nanofiber Scaffold for Osteochondral Interface Tissue Engineering, 59th Annual Meeting of the Orthopaedic Research Society, San Antonio, Texas, January 26-27th, 2013.
205. J. Wang, B. Zhou, X. Liu, E. Stein, E. Shane, **X. Guo**, Accurate and fast strength predictions of patient-specific HR-pQCT-based plate-rod models distinguish women with vertebral fractures, 59th Annual Meeting of the Orthopaedic Research Society, San Antonio, Texas, January 26-27th, 2013.
206. A. D. Baik, I. Kalajzic, E. M. Hillman, Y. Wang, C. Dong, **X. Guo**, Contracting Osteocytes Synchronized with Calcium Signaling Under Fluid Flow, 59th Annual Meeting of the Orthopaedic Research Society, San Antonio, Texas, January 26-27th, 2013.
207. I. P. Leong, A. D. Baik, H. T. Cheong, **X. Guo**, Visualization of Cytoplasmic and Endoplasmic Reticulum Calcium Dynamics in Bone Cells using FRET-based Approach, 59th Annual Meeting of the Orthopaedic Research Society, San Antonio, Texas, January 26-27th, 2013.
208. J. Wang, B. Zhou, **X. Guo** Trabecular Microstructure Differs Greatly between Trabecular Groups in Proximal Femurs of Postmenopausal Women, 59th Annual Meeting of the Orthopaedic Research Society, San Antonio, Texas, January 26-27th, 2013.
209. X. Zhang, J. Caldwell, S. Ilkhani-Pour, N. G. Goldhaber, B. Zhou, **X. Guo**, L. J. Soslowsky, W. N. Levine, H. Lu, In Vivo Evaluation of a Bi-Phasic Nanofiber Scaffold for Integrative Rotator Cuff Repair, 59th Annual Meeting of the Orthopaedic Research Society, San Antonio, Texas, January 26-27th, 2013.
210. B. Zhou, B. Silva, J. Wang, D. J. McMahon, C. A. Zhang, J. Udesky , S. Boutroy, S. Elizabeth, J. P. Bilezikian, **X. Guo**, Dramatic Loss in Trabecular Plates and Compromised Bone Stiffness in Postmenopausal Women with Primary Hyperparathyroidism, 59th Annual Meeting of the Orthopaedic Research Society, San Antonio, Texas, January 26-27th, 2013.

211. Nishiyama, K, Wang, J., Young, P., Recker, R., Lappe, J., Cremers, S., **Guo, X**., Shane, E., and Cohen, A., Teriparatide Is Associated with Improved Microarchitecture and Estimated Bone Strength in Premenopausal Women with Idiopathic Osteoporosis: An HR-pQCT Study, Annual Meeting of the American Society for Bone and Mineral Research, Baltimore, Maryland, October 4-7, 2013.
212. Kepley, A., Zhang, C., Zhou, B., McMahon, D., **Guo, X.**, Shane, E., and Nickolas, T., Differences in Bone Geometry, Mass and Microarchitecture between Asian and Caucasian Young Men, Annual Meeting of the American Society for Bone and Mineral Research, Baltimore, Maryland, October 4-7, 2013.
213. Nishiyama, K., Iyer, S., Nikkel, L., Zhang, C., Dworakowski, E., Cremers, S., Zhou, B., McMahon, D., **Guo X**., Shane, E., Nickolas, T., Pathogenesis of Cortical Deficits and Decreased Bone Stiffness after Kidney Transplantation, Annual Meeting of the American Society for Bone and Mineral Research, Baltimore, Maryland, October 4-7, 2013.
214. Sutter, S., Nishiyama, K., Kepley, A., Nickolas, T., Cohen, A., Zhou, B., **Guo, X.** Shane, E., and Stein, E., Abnormal Microarchitecture and Stiffness in Postmenopausal Women Treated with Glucocorticoids, Annual Meeting of the American Society for Bone and Mineral Research, Baltimore, Maryland, October 4-7, 2013.
215. Zhou, B., Yin, M., Arpadi, S., Wang, J., Nishiyama, K., Broun, E., Shah, J., Zhang, C., Foca, M., Neu, N., Nelson, J., Bell, D., Shane, E., and **Guo, X.**, Trabecular Plate Deficiencies in Young Men Infected with HIV Early in Life, Annual Meeting of the American Society for Bone and Mineral Research, Baltimore, Maryland, October 4-7, 2013.
216. Baik, A., Kalazic, I., Hillman, E. M. C., Wang, Y., Dong, C., and **Guo, X.**, Calcium-dependent actomyosin contractility in osteocytes, Annual Meeting of the American Society for Bone and Mineral Research, Baltimore, Maryland, October 4-7, 2013.
217. Wang, J., Zhou, B., Stein, E., Shane, E., and **Guo, X.**, Highly efficient HRpQCT-based plate and rod (PR) finite element models of whole bone distinguish postmenopausal women with vertebral fractures, Annual Meeting of the American Society for Bone and Mineral Research, Baltimore, Maryland, October 4-7, 2013.
218. Yu, E., Wang, J., Zhou, B., Zhang, Z., and **Guo, X.** Trabecular Plates Have Different Elastic Modulus and Tissue Mineral Density (TMD) from Trabecular Rods in Human Trabecular Bone, Annual Meeting of the American Society for Bone and Mineral Research, Baltimore, Maryland, October 4-7, 2013.
219. Subramony, S. D., Qu, D., Ma, R., Schaer, M., **Guo, X. E.**, Doty, S. B., Rodeo, S. A, and Lu, Helen, In vitro Optimization and In Vivo Evaluation of a Multi-phased Nanofiber-Based Synthetic ACL Scaffold, 60th Annual Meeting of Orthopaedic Research Society, New Orleans, March 15-18th, 2014.
220. Zhang, X., Caldwell, J-M, Easley, J. T., Hackett, E., Doty, S. B., Levin, W. N., **Guo, X. E.**, Lu, H. H. In Vivo Evaluation of a Biomimetic Biphasic Scaffold in Sheep, 60th Annual Meeting of Orthopaedic Research Society, New Orleans, March 15-18th, 2014.
221. Wang, J., Stein, E. M., Zhou, B., Nishiyama, K. K., Shane, E., and **Guo, X. E.** Abnormal Trabecular Plates and Cortical Thinning at the Distal Radius and Tibia in Postmenopausal Women with Vertebral Fractures, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.

222. Zhou, B., Wang, J., Yu, Y. E., Zhang, Z., Nishiyama, K. K., Rosete, F. R., Keaveny, T. M., Shane, E., and **Guo, X. E.** Are Left and Right the Same? Contralateral Microstructural and Biomechanical Differences in Human Radius and Tibia, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
223. Yu, E., Wang, J., Zhou, B., and **Guo, X. E.** Tissue Mineral Density Dependent Mechanical Properties of Individual Trabecula Plates and Rods Do Not Differ in Anatomic Directions but Individual Trabecular Directions, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
224. Walker, M., Nishiyama, K., Cong, E., Lee, J., Kepley, A., Zhang, C., **Guo, X. E.**, and Silverberg, S. Low Vitamin D Levels in Primary Hyperparathyroidism Affect Cortical Bone Density and Porosity but not Estimated Bone Stiffness, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
225. Zhou, B., Wang, J., Yu, E., Zhang, Z., Nishiyama, K., Shane, E., and **Guo, X. E.** HR-pQCT based measurements of the distal tibial segment predict whole tibia stiffness, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
226. Brown, G., and **Guo, X. E.** Endoplasmic Reticulum Calcium Handling in Osteocyte Mechanobiology, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
227. Nishiyama, K., Stein, E., Sutter, S., McMahon, D., **Guo, X. E.**, and Shane, E., HR-pQCT, Finite Element Analysis, and Machine Learning with Support Vector Machines Improved Classification of Postmenopausal Women with Fragility Fractures, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
228. Stein, E., Nishiyama, K., Nicklas, T., Sutter, S., McMahan, D., Guo, X. E., and Shane, E. In Postmenopausal Women with Stage 3 CKD, Fractures are Associated with Abnormalities in Both Trabecular and Cortical Bone, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
229. Bian, Q., Zheng, L., Xu, X., Jain, A., Kebaish, K., Zheng, G., Xie, H., Crane, J., Wan, M., Sponseller, P., Zhang, Z., Guo, X. E., Riley, L., Wang, Y., Cao, X., Inhibition of TGFb activity in Nucleus Pulposus Attenuate Disc Degeneration, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
230. Wang, J., Zhou, B., Nishiyama, K., Sutter, S., Guo, X. E., Stein, E., Trabecular Plate-Rod Morphology and Connectivity are Abnormal and Associated with Reduced Bone Stiffness in Women Treated with Glucocorticoids, American Society for Bone and Mineral Research Annual Meeting, Houston, September 12-15th, 2014.
231. Yu, Y. E., Wang, J., Zhou, B., Zhang, Z., and Guo, X. E. Tissue Mineral Density Dependent Mechanical Properties of Individual Trabecular Plates and Rods Do Not Differ in Anatomic Directions but Individual Trabecular Directions, 61st Annual Meeting of Orthopaedic Research Society, Las Vegas, March 28-31st, 2015.
232. Brown, G., Desai, P., and Guo, X. E. Intracellular and Endoplasmic Reticulum Calcium Dynamics in Osteocyte Mechanobiology, 61st Annual Meeting of Orthopaedic Research Society, Las Vegas, March 28-31st, 2015.
233. Zhou, B., Wang, Ji, Yu, Y. E., Zhang, Z., Sheng, R., Wang, A., Nishiyama, K. K.,

Shane, E., and Guo X. E. Comprehensive Validations of HR-pQCT Based Morphological and Biomechanical Measures of Human Distal Radius and Tibia, 61st Annual Meeting of Orthopaedic Research Society, Las Vegas, March 28-31st, 2015.

234. Wang, J., Stein, E. M., Zhou, B., Nishiyama, K. K., Shane, E., and Guo, X. E. Deterioration of Trabecular and Cortical Microarchitecture and Reduced Bone Stiffness at Distal Radius and Tibia in Postmenopausal Women with Vertebral Fractures, 61st Annual Meeting of Orthopaedic Research Society, Las Vegas, March 28-31st, 2015.
235. Morrell, A. E., Da, J., Baik, A. D., and Guo, X. E. $[Ca^{2+}]_i$ and Actin Dynamics in Osteocytes in Intact Mouse Tibiae under Cyclic Mechanical Loading, 61st Annual Meeting of Orthopaedic Research Society, Las Vegas, March 28-31st, 2015.
236. Zhou, B., Wang, Ji, Yu, Y. E., Zhang, Z., Rosete, F., Nishiyama, K. K., Shane, E., and Guo X. E. Are Left and Right the Same? Contralateral Microstructural and Biomechanical Differences in Radius and Tibia, 61st Annual Meeting of Orthopaedic Research Society, Las Vegas, March 28-31st, 2015.

F. Inventions and Patents

1. Lu, Helen, H., Jiang, Jie, Hung, Clark, T., **Guo, X. Edward**, and Ateshian, Gerard US Patent #: 60/550,809, Polymer-Ceramic-Hydrogel Composite Scaffold for Osteochondral Repair.
2. **Guo, X. Edward**, Liu, Xiaowei S., and Paul, Saida, US Patent #: 60/711,059, Systems, Products, and Methods for Predicting Changes and Fracture in Trabecular Bone.
3. **Guo, X. Edward,** Hillman, Elizabeth Marjorie, Lu, X. Lucas, and Baik, A. D. Quasi-3D multi-channel fluorescent microscopy technique, Provisional US Patent application

G. Research Grants Awarded

Completed

1. Whitaker Foundation 97-0086 (PI) 1/1/98-5/31/2001
$209,975 (TC[1])

Quantification of *In Vivo* Cellular Adaptation of Trabecular Bone by Mechanical Stimulation

2. [2]NIH/NIAMS 1 R03 AR045832-01 (PI) 9/1/98-8/31/2001
$245,732 (TC)

Bone Response to Combined Mechanical and PTH Stimulation

3. [3]NSF Faculty Early Career Development Award (PI) 7/1/99-6/30/2003
$220,000 (TC)

[1] TC: Total cost
[2] NIH: National Institutes of Health; NIAMS: National Institute of Musculoskeletal and Skin Diseases
[3] NSF: National Science Foundation

CAREER: An Efficient 3D Representation for Modeling Trabecular Bone Microstructure and Development of An Integrated Program in Computational Biomechanics

4. Whitaker Foundation TF 97-0086 (PI) 12/15/2001-12/14/2002
$80,000 (TC)

Gene Expression of Bone Cells in Response to Combined Mechanical and PTH Stimulation

5. NIH/NIAMS R01 AR048287 (PI) 5/1/2002-4/30/2007
$1,304,286 (TC)

Bone Response to Combined Mechanical and PTH Stimulation

6. NIH/NIAMS R21 AR048791 (Co-PI; PI: Hung, Clark T.) 3/1/2002-2/28/2005
$350,763 (TC)

Novel Determination of Chondrocyte Material Properties

7. NIH/NIAMS R01 AR049922 (Co-PI; PI: Hung, Clark T.) 9/26/1/2002-8/31/2007
$1,041,497 (TC)

Intervertebral Disc Response to Cyclic Loading *In Vivo*

8. NIH/NIAMS R21 AR049613 (PI) 9/30/2002-8/31/2006
$480,817 (TC)

Debonding Strength of Cement Lines in Human Cortical Bone

9. Schlumberger-Doll Research (PI) 12/07/2004-12/06/2006
$28,998 (TC)

Production of Bovine Trabecular Bone Samples and Mechanical Testing

10. NIH/NIAMS R21 AR052417 (PI) 5/1/2006-4/30/2008
$426,361 (TC)

Mechanotransduction in Osteocytic Network and Osteoblast

11. National Natural Science Foundation of China, Funds for Talented Professionals (Joint Research Fund for Overseas Chinese Young Scholars), 10628205 (PI) 1/1/2007-12/1/2009
¥400,000 (TC) (~$50,000)

Computational Models of Bone Adaptation

12. NIH/NIAMS R01 AR053156 (Co-Investigator; PI of subcontract)
(PI: Wehrli, Felix W. University of Pennsylvania, Bioengineering Research Partnership Grant)
9/23/2005-6/30/2010
$4,342,745
$422,896 (TC, Columbia Sub)

Structural MRI of Trabecular Bone in Monitoring Therapy

13. NIH/NIAMS U01 AR 055068 (Co-Investigator, PI: Elizabeth Shane) 5/1/07-4/30/10
$724,500 (TC)

Ultra-high Resolution pQCT as a Biomarker of Bone Strength in Osteoporosis Trials

14. NIH/NIBIB/NIAMS R13EB012902 (PI, co-PI: Cheng Dong) 9/22/2010-9/21/2011
BMES-SPRBM Conference on Cellular and Molecular Bioengineering
$13,000 (TC)

15. NSF CMMI-1108614 (PI) 1/1/2011-12/31/2011
BMES-SPRBM Conference on Cellular and Molecular Bioengineering
$4,500 (TC)

16. NIH/NIAMS R01AR055647 (Co-Investigator, PI: Felix W. Wehrli) 12/01/07-11/30/11
$1,350,500 (TC)
$376,098 (Columbia Sub)
Osteoporosis Treatment Response Assessed by Micromechanical Modeling of MRI Data

17. NIH/NIAMS RC1AR058453 (PI) 10/1/2009-9/30/2012
Implicit Learning in Osteocyte Network under Mechanical Loading
$915,108 (TC)
18. NIH/NIAMS R21AR059917 (PI) 8/1/2010-7/31/2013
Pseudo-3D Cytoskeletal Dynamics and Signal Activation in Osteocytes under Flow
$335,049 (TC)
19. NIH/NIAMS R01AR054447 (Co-Investigator, PI: Stavroula Kousteni), 4/1/2008-1/31/2013
Hormonal Control of Periosteal Expansion

20. NIH/NIAMS R01 AR052461 (PI) 10/1/2009-9/30/2016
Mechanobiology of 3D Trabecular Bone Explants
$1,759,307 (TC)
21. NIH/NIDDK R01 DK032333 (Co-Investigator, PI: John P. Bilezikian) 9/1/08-8/31/13
Primary Hyperparathyroidism

22. NIH/NIA P01 AG032959 (Co-Investigator, PI: Gerard Karsenty), 8/1/2010-7/31/2015
Serotonin as A Regulator of Bone Mass Accrual: Basic And Clinical

23. NIH/NIDDK R01DK084986 (Co-Investigator, PI: Shonni J. Silverberg,) 7/1/2010-6/30/2015
Vitamin D Deficiency in Primary Hyperparathyroidism

24. NIH/NIDDK R01DK069350 (Co-Investigator, PI: John P. Bilezikian)7/1/2010-6/30/2015
Bone Properties in Hypoparathyroidism: Effects of PTH on Skeletal Dynamics in Patients with Longstanding Hypoparathyroidism

25. NIH/NIAMS R01 AR060361 (Co-Investigator, PI: Gerard A. Ateshian) 9/20/2011-8/31/2015
Optimizing Nutrient Supply in Large Engineered Cartilage Tissue Constructs

26. NSF CMMI-1427519 (PI) 2/21/2014-2/20/2016
International Workshop on Multiscale Mechanobiology; Hong Kong; May 15-18, 2014
$99,960 (TC)

Current

27. NIH/NIAMS R01 AR051376 (PI) 5/1/2006-4/30/2017
$3,087,709 (TC)
Micro-Mechanical Modeling of Trabecular Bone

28. NIH/NIAMS R01 AR058004 (PI) 7/1/2010-6/30/2017
Clinical Bone Mechanics Using HR-pQCT and µMRI
$3,325,076 (TC)

29. NIH/NIAMS R01 AR065564 (PI) 9/01/2016-3/31/2021
Calcium and Contractile Dynamics in Osteocyte Networks under Mechanical Loading
$1,980,060 (TC)

Pending

30. NIH/NIAMS T32 AR064182 (PI) 7/01/2016-6/30/2021
Postdoctoral Training Program in Molecular Genetics, Bioengineering, and Endocrinology
$725,972 (TC)

31. NIH DP1 OD020718 (PI) 09/30/2015-07/31/2020
Solving Wolff's Law: Monocyte-Mediated, Mechanically-Driven Tissue Adaptation
$2,500,000 (DC)

32. NIH/NIAMS R01 AR058004 (PI) 7/1/2015-6/30/2020
Clinical Bone Mechanics Using HR-pQCT and MRI
$3,679,450 (TC)

33. NIH/NIAMS R01 AR071295 (PI, co-PI: Elizabeth Shane) 04/01/2017 - 03/31/2022
Subchondral Trabecular Plate and Rod Abnormalities in Human Osteoarthritis
$3,974,582 (TC)