CURRICULUM VITAE

Name: William Joel Landis

Address: Department of Polymer Science
College of Polymer Science and Polymer Engineering
Goodyear Polymer Center, Room 1215
The University of Akron
Akron, OH 44325

Place of Birth: Clarksville, Tennessee

Education:

1965 B.S.	University of Massachusetts, Amherst (Physics), magna cum laude
1967 S.M.	Massachusetts Institute of Technology (Biology)
1972 Ph.D.	Massachusetts Institute of Technology (Biophysics)

Academic Appointments:

1972-1974	Associate in Orthopaedic Surgery, Harvard Medical School, Boston
1974-1981	Research Associate in Orthopaedic Surgery (Anatomy), Harvard Medical School, Boston
1981-1984	Assistant Professor of Orthopaedic Surgery (Anatomy) in the Laboratory for Skeletal Disorders and Rehabilitation, Harvard Medical School, Boston
1984-1996	Associate Professor of Orthopaedic Surgery (Anatomy and Cellular Biology) in the Laboratory for Skeletal Disorders and Rehabilitation, Harvard Medical School, Boston
1988-1989	Fulbright Scholar, The Weizmann Institute of Science, Rehovot, Israel
1996-1998	Associate Professor of Orthopaedic Surgery, Harvard Medical School, Boston
1998-2005	Professor and Chair, Department of Biochemistry and Molecular Pathology, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio
1998-2001	Lecturer in Orthopedic Surgery, Harvard Medical School, Boston
1998-2001	Special member of the graduate faculty, University of Colorado, Boulder
1999-present	Full member of the graduate faculty, Kent State University, Kent, Ohio
1999-2010	Adjunct professor, Department of Biomedical Engineering, University of Akron, Akron, Ohio
1999-2008	Adjunct professor, Department of Biochemistry, School of Dental Medicine, University of Pennsylvania, Philadelphia, Pennsylvania

1999-2007	Professor of Orthopaedic Surgery, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio
2000-present	Adjunct professor, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio
2005-2007	Professor of Biochemistry and Molecular Pathology, Department of Immunology, Microbiology, and Biochemistry, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio
2007-present	Professor of Orthopaedic Surgery, Department of Orthopaedic Surgery, Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Rootstown, Ohio
2007-2010	Professor of Biochemistry and Molecular Pathology, Department of Integrative Medical Sciences, Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Rootstown, Ohio
2010-present	G. Stafford Whitby Professor in Polymer Science, Department of Polymer Science, University of Akron, Akron, OH

Hospital Appointments:

1972-1975	Research Assistant in Orthopaedic Surgery, Children's Hospital, Boston
1975-1980	Research Associate in Orthopaedic Surgery, Children's Hospital, Boston
1999-2001	Senior Research Associate, Department of Orthopaedic Surgery, Laboratory for Skeletal Disorders and Rehabilitation, Children's Hospital, Boston

Other Professional Positions:

1976-1978	Supervisor, Histology Core Facility, Department of Orthopaedic Surgery, Children's Hospital, Boston
1978-1998	Director, Electron Optical Core Facility, Department of Orthopaedic Surgery, Children's Hospital, Boston
1990-1995	Ad hoc grant reviewer, American Institute of Biological Science, Washington, D.C.
1990-1995	Ad hoc grant reviewer, Medical Research Council, Ottawa, Ontario, Canada
1994-1998	Editorial Board, *Cells and Materials*
1976-present	Referee of scientific publications for *Proceedings of National Academy of Science, USA, J. of Ultrastructure Research, J. of Structural Biology, Science, J. of Bone and Mineral Research, Scanning Electron Microscopy, Bone, J. of Dental Research, J. of Cell Biology, Matrix Biology, The Anatomical Record, Calcified TissueResearch, Connective Tissue Research, Calcified Tissue International, Cells and Materials, J. of Statistical Physics, Transactions of the Orthopaedic Research Society, Microscopy and Microanalysis, Paleobiology, Tissue Engineering* and others
1994	Ad hoc grant reviewer, The Wellcome Trust, London, England

1994-1995	Principal Investigator, bone culture experiments aboard STS-59 NASA space shuttle, Endeavour, Kennedy Space Center, Florida, and Dryden Flight Research Center, California. Launched April 9, 1994
1995-1996	Principal Investigator, bone culture experiments aboard STS-63 NASA space shuttle, Discovery, Kennedy Space Center, Florida, and Dryden Flight Research Center, California. Launched February 2, 1995
1997-1999	Member, Baylor College-Harvard-MIT consortium, NASA National Space Biomedical Research Institute
2002-present	Editorial Board, *Microscopy and Microanalysis*
2002-present	Editorial Board, *Journal of Structural Biology*
2003-2008	External advisory board member, Cleveland Clinic Foundation Musculoskeletal Core Center
2003-2007	Ad hoc grant reviewer, National Medical Research Council, Singapore
2003	Ad hoc grant reviewer, March of Dimes, Birth Defects Foundation
2004-2006	Editorial board, *Journal of Dental Research*
2004-present	Editorial board, *Journal of Bone and Mineral Research*
2005-present	Editorial board, *Biological Sciences in Space* (Japan)
2005-present	Editorial board, *Gravitational and Space Biology*
2006-present	External advisory board member, musculoskeletal training grant, Case Western Reserve University
2006	Ad hoc grant reviewer, Biomedical Engineering Research Bureau, New Zealand
2008-present	Ad hoc grant reviewer, Musculoskeletal Transplant Foundation

Awards and Honors:

1962	Phi Eta Sigma
1963	Senator-at-Large, Student Government, University of Massachusetts
1964	Vice-President, Student Government, University of Massachusetts
	Captain, University of Massachusetts nationally undefeated team, General Electric College Bowl - NBC Television competition
1965	President, Student Government, University of Massachusetts
	Phi Kappa Phi
	Phi Beta Kappa
	B.S. (Physics) magna cum laude
	Adelphia, senior men's honor society, University of Massachusetts
	Who's Who in American Colleges and Universities
1972	Sigma Xi
1965-1972	Predoctoral Traineeship, National Institutes of Health
1981-1983	Whitaker Health Sciences Fund awardee, "Use of Scanning Auger Microscopy and X-ray Photoelectron Spectroscopy for Studies of Mineralized Biological Tissues"
1983	Kappa Delta Award, American Academy of Orthopaedic Surgeons, awarded for scientific contributions to the field of musculoskeletal research

1984	William F. Milton Fund awardee, "Elemental Analysis in Vertebrate Calcified Tissues by Imaging Ion Microscopy"
1985	Stauffer Award for the most outstanding basic laboratory manuscript appearing in *Investigative Radiology* in 1984 (Seltzer et al., see bibliography)
1985	Co-Chairman-elect, 1987 Gordon Conference on Calcium Phosphates
1987	Co-Chairman, Gordon Conference on Calcium Phosphates
1988	Chairman-elect, 1989 Gordon Research Conference on Calcium Phosphates
1988-1989	Fulbright Senior Research Scholar
1989	Chairman, Gordon Research Conference on Calcium Phosphates
1991	Cecil E. Hall Award for the most outstanding work presented at the annual meeting of the Electron Microscope Society of America, San Jose, CA (McEwen et al., 1991, see bibliography)
1994	Who's Who in the East
1994	American Men and Women of Science
1997	Harold C. Copp Prize from the German Osteological Society for outstanding and ground-breaking contribution to the literature (Fratzl et al., *J. Clin. Invest.*, 1996, see bibliography)
1997	Joseph E. Murray Award for the outstanding work presented at the annual meeting of the New England Society of Plastic and Reconstructive Surgeons, Woodstock, VT (Isogai et al., 1997, see bibliography)
1999	Visiting professor pro tempore, Cleveland Clinic Educational Foundation, Cleveland, OH
2000	Visiting professor pro tempore, Department of Orthopaedics, Case Western Reserve University, Cleveland, OH
2000	Keynote speaker, First Annual Orthopaedic Research Day, Department of Orthopaedics, Case Western Reserve University, Cleveland, OH
2000	Guest speaker, Ohio Orthopaedic Society
2001	Technology Forum Award for outstanding abstract presented at Microscopy and Microanalysis 2001 (Jacquet et al., 2001, see bibliography)
2002	Keynote speaker, 11th Research Council Meeting of the Japan Society of Plastic and Reconstructive Surgery, Sendai, Japan
2003	Faculty inductee, Alpha Omega Alpha, honor medical society
2003	Keynote speaker, Japan Society of Teratology, Osaka, Japan
2005	Hooder, Class of 2005 Commencement, Northeastern Ohio Universities College of Medicine
2006-present	National tour speaker, Microscopy Society of America
2008	Keynote speaker, Internal Medicine Residency Research Day, Northeastern Ohio Universities Colleges of Medicine and Pharmacy
2008	Keynote speaker, Midwest Orthopaedic Research and Education Foundation, annual meeting, Akron, Ohio
2009	Keynote speaker, Midwest Orthopaedic Research and Education Foundation, 2nd annual meeting, Akron, Ohio

Major Committee Assignments:

National and Regional:

1989-1991	Ad hoc member, General Medicine B Scientific Study Section, Division of Research Grants, National Institutes of Health
1990-1992	Ad hoc member, American Institute of Biological Science, Research Grant Review, National Aeronautics and Space Administration
1990-1992	Local arrangements committee, 50th Anniversary meeting of the Electron Microscopy Society of America and 25th Anniversary meeting of the New England Society for Electron Microscopy, Boston, MA, August 17-21, 1992
1992-1995	Scientific Advisory Board, Fifth International Conference on the Chemistry and Biology of Mineralized Tissues, Kohler, Wisconsin, October 22-27, 1995
1996-1998	Scientific Advisory Board, Sixth International Conference on the Chemistry and Biology of Mineralized Tissues, Vittel, France, November 1-6, 1998
1999-2001	Scientific Advisory Board, Seventh International Conference on the Chemistry and Biology of Mineralized Tissues, Ponte Vedra Beach, Florida, November 4-9, 2001
1999-2004 1999-2005	Steering committee, Department of Orthopaedic Surgery, Children's Hospital, Akron, Ohio
1999-2006	Association of Medical and Graduate Departments of Biochemistry
2000	Member, Ohio Task Force on Biotechnology
2001-2004	Co-organizer, Eighth International Conference on the Chemistry and Biology of Mineralized Tissues (Banff, Alberta, Canada; October, 2004)
2002-2005	Member, Governing Board, American Society for Gravitational and Space Biology
2003-2006	Member, Board of Directors, Association of Medical and Graduate Departments of Biochemistry
2003-2004	Co-organizer, Symposium on Biological and Bio-inspired Materials and Devices, Materials Research Society (San Francisco, CA; April, 2004)
2004-2005	Co-organizer, Symposium on the Structure and Mechanical Behavior of Biological Materials, Materials Research Society (San Francisco, CA; March, 2005)
2004-present	Member, Executive Board, International Conferences on the Chemistry and Biology of Mineralized Tissues
2007	Member, Talent Development Working Group Subcommittee, Orthopedic Institute of Akron
2008-2009	Co-organizer, Symposium on Structure-Function Relationships in Biomaterials, Materials Research Society (San Francisco, CA; April, 2009)

Children's Hospital:

1991-1998	Research Faculty Council, Children's Hospital, Boston

Northeastern Ohio Universities Colleges of Medicine and Pharmacy:

1998-2005	Academic Council
1998-2005	Basic Medical Sciences Advisory Committee
1998-2005	Professional Development Advisory Team Committee
1999	Review Committee for Department of Orthopaedic Surgery
1999	Review Committee for Department of Anatomy
1999-2003	Academic Review and Promotions Committee, Class of 2003
1999-2002	Research Committee
1999	Tenure Review Committee for Dr. Mark Simmons, Department of Neurobiology/Pharmacology
2000	Tenure Review Committee for Dr. Kathleen Doane, Department of Anatomy
2000	Clinical Faculty Rank Committee
2001-2003	By-Laws Committee
2001	Committee on Structural Reporting Relationship of the Information and Education Technology Division
2001	Tenure Review Committee for Walter Horton, Jr., Ph.D., Department of Anatomy
2001-2003	Information and Education Technology Committee
2001-2005	Graduate Student Co-ordinating Committee
2002-2005	Phase I Academic Review and Promotions Committee
2002	Liaison Committee for Medical Education Clinical Sciences Subcommittee
2002	Chair, Liaison Committee for Medical Education Research Subcommittee
2002-2004	Promotions and Tenure Committee
2002-2003	M1/M2 Curriculum Committee
2002-2010	Faculty advisor, Student Biomedical Research Interest Group
2003-2010	B.S./M.D. Admissions Committee
2003	Integration and Themes Curriculum Committee
2004	Course/Module Content Design for Prologue: Bridge to Medical School
2004-2010	Interviewer, MD Direct Entry Candidates, NEOUCOM, and BS/MD Candidates, Kent State University
2004-2005	Chair, Task Force for Assessing the New Medical Curriculum on Graduate Education
2005-2010	Phase I Admissions Committee, Kent State University
2006-2007	B.S./M.D. Admissions Working Group Subcommittee
2006-2010	Skeletal Biology Focus Group, Executive Board
2007	Advisory Committee, Chair for Department of Community Health Sciences

2008-2010	Chair, Tenure Development Committee for Anupam Bishayee, Ph.D., Department of Pharmaceutical Sciences
2009-2010	Tenure Development Committee for Elizabeth Piatt, Ph.D., Department of Behavioral and Community Health Science
2009-2010	Tenure Development Committee for Kristin R. Baughman, Ph.D., Department of Behavioral and Community Health Science

Memberships in Professional Societies:

1973-present	New England Society for Electron Microscopy
1975-present	Orthopaedic Research Society
1975-1978	Director, Biological Sciences, New England Society for Electron Microscopy
1979-1984	Director, Job Desk for Biological Sciences, New England Society for Electron Microscopy
1980-present	Microbeam Analysis Society
1980-present	International Association for Dental Research
1981-present	Electron Microscopy Society of America
1981-present	American Society for Bone and Mineral Research
1984-1985	Vice-president, New England Society for Electron Microscopy
1985-1986	President, New England Society for Electron Microscopy
1990-present	American Society for Gravitational and Space Biology
1991-present	American Society for Cell Biology
1991-present	Fulbright Association
1998	President-elect and program chair, New England Society for Electon Microscopy
1999-present	Microscopy Society of Northeastern Ohio
1999-2001	Trustee (director), Microscopy Society of Northeastern Ohio
1999-present	American Society for Matrix Biology
2001-2002	President-elect, Microscopy Society of Northeastern Ohio
2002-2003	President, Microscopy Society of Northeastern Ohio
2003-2004	Past-president, Microscopy Society of Northeastern Ohio

Major Research Interests:

1. Mineral-matrix structure and interaction in normal (bone, calcifying cartilage and tendon, enamel, dentin, and cementum) and abnormal (osteogenesis imperfecta, osteoporosis, osteopetrosis) vertebrate tissues

2. Bone, cartilage, and tendon biochemistry

3. Tissue engineering of calcified tissues

4. Effects of mechanical, gravitational, and electromagnetic forces on calcified tissues

5. Orthopeadic pathologies involving osteoarthritis, slipped capital femoral epiphysis, hypothyroidism, dysplasia, and clubfoot

Consultantships:

Norian Corporation (CA)
Meadox Medical (NJ)
Avian Farms International (ME)
Ethyl Corporation (LA)
Rutgers University (Piscataway, NJ)
Massachusetts General Hospital (Boston, MA)
Genetics Institute (Boston and Andover, MA)
American Science and Engineering (Cambridge, MA)
Center for Mineral Metabolism and Clinical Research, The University of Texas, Southwestern Medical Center (Dallas, TX)
Tissue Genesis, Inc. (Honolulu, HA)

Teaching Experience:

1967-1969	Teaching assistant (lecturer) for course and laboratory in electron microscopy, Massachusetts Institute of Technology
1969-1970	Physics teacher, Duxbury High School, Duxbury, Massachusetts
1979-1983	Course participant and lecturer on mechanism of calcification, Harvard Medical School core clinical elective in Orthopaedic Surgery
1980-1984	Participant and lecturer on calcification, Tufts University School of Medicine, course on musculoskeletal system
1980-1984	Participant and lecturer on biophysical techniques applied to orthopaedic research, Harvard Medical School-Massachusetts Institute of Technology, course on musculoskeletal system
1980-1994	Participant and lecturer on calcification, Tufts University School of Veterinary Medicine course on pathobiology of the skeleton
1981-1992	Private tutor, high school mathematics and science; Wayland, Weston, and Sandwich, Massachusetts
1987-present	Participant and lecturer on theories of mineralization, graduate school course on connective and mineralized tissues, Oral Biology 604B, Harvard School of Dental Medicine
1992-1998	Participant and lecturer on calcification, graduate school course on biology, biochemistry, and physiology of the skeletal system of vertebrates, Harvard University
1994-1998	Participant and lecturer on calcification, Children's Hospital orthopedic seminar series on pathobiology of pediatric orthopedic conditions
1999-present	Participant and lecturer, Molecules to Cells, Biochemistry and Molecular Pathology, M1 and M2 (first and second year) medical school courses, Northeastern Ohio Universities College of Medicine

1999-2005	Tutor, Problem-based learning curriculum, M1 (first year) medical school course, Northeastern Ohio Universities College of Medicine
1999-2005	Participant and lecturer, Biomaterials and Cell Biology, graduate school course, Case Western Reserve University
1999-present	Participant and lecturer, Biomaterials Science, graduate school course, University of Akron
2000	Participant and lecturer, Microscopic Methods in Biology, graduate school course, Kent State University and Northeastern Ohio Universities College of Medicine
2005-present	Participant and lecturer on tissue engineering, graduate school course on connective and mineralized tissues, Oral Biology 604B, Harvard School of Dental Medicine
2006	Participant and lecturer, Integrated Skeletal Biology, graduate school course, Kent State University and Northeastern Ohio Universities College of Medicine
2007-present	Participant and lecturer, Skeletal Biology, graduate school course PHOL512, Case Western Reserve University
2008	Facilitator, Capstone for Medicine, M4 medical school course, Northeastern Ohio Universities Colleges of Medicine and Pharmacy

Principal Service Responsibilities:

1977-1998	Supervisor and teacher of users of Electron Optical Core Facility, Department of Orthopaedic Surgery, Children's Hospital. Users included faculty members, clinical fellows, graduate students, undergraduates, and research technicians from Beth Israel Hospital, Massachusetts Institute of Technology, Harvard School of Dental Medicine, Harvard Medical School, and Children's Hospital

Research Grants:

7/1/78-6/30/96	Project Leader, NIH Grant AM 34078, "Electron Optical and Microprobe Analysis of Mineralized Tissues," approximate total project direct costs $2,700,000
1/1/80-12/31/83	Principal Investigator, NIDR Grant DE 05351, "Electron Optical Examination of Mineralized Tissues," total direct costs $100,045
7/1/81-12/31/83	Principal Investigator, Harvard Medical School-Massachusetts Institute of Technology, Whitaker Health Sciences Fund Grant, "Use of Scanning Auger Microscopy and X-ray Photoelectron Spectroscopy for Studies of Mineralized Biological Tissues," total direct costs $12,414
7/1/84-7/1/86	Principal Investigator, Harvard Medical School, William F. Milton Fund Grant, "Elemental Analysis in Vertebrate Calcified Tissues by Imaging Ion Microscopy," total direct costs $15,000

7/1/88-12/31/96	Principal Investigator, National Aeronautics and Space Administration Grant NAG-2-538, "Effect of Gravity on Bone Matrix Production and Mineralization," total direct costs $764,854
5/1/92-4/30/96	Principal Investigator, NIH Grant AR 41452, "Mineral-Matrix Relations in Vertebrate Calcifying Tissues," total direct costs $801,518
5/1/96-4/30/02	Principal Investigator, NIH Grant AR 41452, "Mineral-Matrix Relations in Vertebrate Calcifying Tissues," total direct costs $882,395
4/15/97-7/31/03	Principal Investigator, National Aeronautics and Space Administration, Grant NAG-5-4377, "Effect of Hypergravity on Bone Matrix Production and Mineralization," total direct costs $352,057
5/1/01-4/30/02	Principal Investigator, Ohio Board of Regents Research Challenge Award 33997, “Effect of Tail Suspension on Tendon Mineralization in OIM Mice,” total direct costs $19,917
4/1/03-3/31/04	Principal Investigator, Ohio Board of Regents Research Challenge Award 34090, “Bone Regeneration Mediated by a Novel Oxygen Delivery System,” total direct costs $7,666
5/1/02-4/30/08	Principal Investigator, NIH Grant AR 41452, "Mineral-Matrix Relations in Vertebrate Calcifying Tissues," total direct costs $1,173,063
3/01/04-8/31/06	Principal Investigator, NIH Grant DE015631, “Eighth International Conference on the Chemistry and Biology of Mineralized Tissues,” total direct costs $35,000
10/1/04-9/30/08	Principal Investigator, NEOUCOM Foundation Grant, “Slipped Capital Femoral Epiphysis,” total costs $43,755
11/1/05-10/31/07	Principal Investigator, National Aeronautics and Space Administration, Grant NNA06CA73G, "Effect of Hypergravity on Bone Matrix Production and Mineralization," total direct costs $67,490
9/1/07-8/31/10	Principal Investigator, NEOUCOM Foundation Grant, “Pediatric Orthopaedic Research,” total costs $75,000
1/1/08-3/31/10	Principal Investigator, Musculoskeletal Transplant Foundation Grant, “Tissue Engineering a Human Phalanx,” total direct costs $116,659
2/1/08-1/31/09	Principal Investigator, Ohio Board of Regents Research Challenge Award 34273, “Tisssue Engineering a Myotendonous Junction,” total direct costs $14,250
11/1/08-6/25/11	Principal Investigator, Subcontract to the Department of Polymer Science, University of Akron (Stephanie Lopina, Ph.D., principal investigator), Ohio Third Frontier Commercialization Program, Clinical Tissue Engineering Center, Cleveland Clinic, “Tissue-Engineering Approaches to Wound Healing,” total direct costs $39,279
2/1/09-1/31/10	Co-principal Investigator, Ohio Board of Regents Research Challenge Award 34317, “The Physiological Response of Bone to Hibernation in Woodchucks (*Marmota monax*),” total direct costs $17,082
3/1/10-8/31/11	Co-principal Investigator, Austen BioInnovative Institute in Akron, “A basis for normal and abnormal cartilage development in vertebrate long bones,” total direct costs $40,000.

Editorial Boards:

Cells and Materials (1994-1998)
Microscopy and Microanalysis (2002-present)
Journal of Structural Biology (2002-present)
Journal of Dental Research (2004-2006)
Journal of Bone and Mineral Research (2004-2010)
Biological Sciences in Space (Japan, 2005-present)
Gravitational and Space Biology (2005-present)

Invited Lectures and Oral Presentations:

"High resolution electron probe microanalysis of bone prepared by inert dehydration and ultracryomicrotomy," 22nd Annual Orthopaedic Research Society Meeting, New Orleans, Louisiana, January 28-30, 1976.

"X-ray microanalysis of molar Ca/P in subcellular structures of bone tissue prepared anhydrously," 24th Annual Orthopaedic Research Society Meeting, Dallas, Texas, February 21-23, 1978.

"Coordinated analytical and electron optical studies of calcification," 12th Annual Symposium on Scanning Electron Microscopy, Washington, DC, April 16-20, 1979.

"Considerations for the electron optical identification of matrix vesicles and mineral phase particles possibly associated with them in calcifying tissues," 27th Annual Orthopaedic Research Society Meeting, Las Vegas, Nevada, February 24-26, 1981.

"Physicochemical characterization of dentin and enamel fractions obtained by density centrifugation," 59th General Session and Annual Meeting, International Association for Dental Research and American Association for Dental Research, Chicago, Illinois, March 19-22, 1981.

"Inorganic-organic interrelations in calcification: On the problem of correlating electron microscopic observations and mechanism," First International Conference on the Chemistry and Biology of Mineralized Connective Tissues, Chicago, Illinois, May 3-7, 1981.

"Temporal sequence of mineralization in calcifying turkey leg tendon," Second International Conference on the Chemistry and Biology of Mineralized Tissues, Gulf Shores, Alabama, September 9-14, 1984.

"Mineralization of vertebrate tissues," Zimmer Corporation, Warsaw, Indiana, April 15, 1985.

"Calcification mechanisms in cartilage: Crystal ghosts or matrix vesicles," Gordon Research Conference on Bones and Teeth, Meriden, New Hampshire, July 14-19, 1985.

"Characterization of the mineral phases initially deposited in calcifying vertebrate tissues," First Lugrin Conference on Crystal Deposition and Dissolution in Tissues, Lugrin, France, September 26-29, 1985.

"Comparative ultrastructural and biochemical analysis of β-glycerophosphate treated and untreated chicken osteoblast cultures," 33rd Annual Orthopaedic Research Society Meeting, San Francisco, California, January 19-22, 1987.

"Bone mineral and tissue analysis by Auger microscopy, XPS, and ion microscopy," Department of Chemistry, State University of New York at Buffalo, Buffalo, New York, February 25, 1987.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 7, 1987.

"Theories of mineralization," Department of Veterinary Science, Musculoskeletal Course, Tufts University School of Veterinary Science, Boston, Massachusetts, September 2, 1987.

"Mechanism of calcification in bone tissues with special reference to the role of phosphoproteins," Forsyth Dental Center, Boston, Massachusetts, October 8, 1987.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 5, 1988.

"Vertebrate mineralization and the role of phosphoproteins," American Dental Association Health Foundation, Gaithersburg, Maryland, April 15, 1988.

"Mechanism of vertebrate mineralization," Grand Rounds, Department of Orthopaedics, Massachusetts General Hospital, Boston , Massachusetts, April 27, 1988.

"Mechanism of vertebrate mineralization," Department of Stomatology, Université de Montréal, Montréal, Québec, Canada, May 2, 1988.

"Mineralization of vertebrate tissues revealed by novel microscopic and x-ray beam methods," Department of Stomatology, Université de Montréal, Montréal, Québec, Canada, May 3, 1988.

"Theories of mineralization," Department of Veterinary Science, Musculoskeletal Course, Tufts University School of Veterinary Science, Boston, Massachusetts, September 1, 1988.

"Vesicle- and collagen-mediated calcification in the turkey leg tendon," Third International Conference on the Chemistry and Biology of Mineralized Tissues, Chatham, Massachusetts, October 16-21, 1988.

"Recent studies of vertebrate mineralization: Interaction of mineral and organic matrix structures revealed by selected area electron diffraction-dark field microscopy and high voltage

stereomicroscopy," Department of Chemistry, The Weizmann Institute of Science, Rehovot, Israel, December 20, 1988.

"The deposition of mineral in vertebrate tissues: Some provocative questions and approaches to answers," Isotope Department, The Weizmann Institute of Science, Rehovot, Israel, January 8, 1989.

"Mineral formation in vertebrate biological systems," Casali Institute of Applied Chemistry, The Hebrew University of Jerusalem, Jerusalem, Israel, March 7, 1989.

"Biological mineralization in bone and tendon," Conference on Controlled Biological Crystal Formation, The Weizmann Institute of Science, Rehovot, Israel, March 20, 1989.

"Aspects of vertebrate mineral formation in the calcifying avian tendon model," Isotope Department, The Weizmann Institute of Science, Rehovot, Israel, March 27, 1989.

"Application of high voltage electron microscopy to studies of avian tendon calcification," Fall Symposium, New England Society for Electron Microscopy, Danvers, Massachusetts, December 1-2, 1989.

"Use of embryonic chick osteoblast cultures for bone studies in space flight: Characteristics of ground-based controls," NASA Space Biology Research Meeting, Half Moon Bay, California, February 2, 1990.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 2, 1990.

"Microscopic studies of mineral structure and organization in calcifying tendon," Forsyth Dental Center, Boston, Massachusetts, April 16, 1990.

"Conventional and high voltage electron microscopy of mineralization in turkey leg tendon," Department of Pathology, Robert Wood Johnson Medical School, University of Medicine and Dentistry of New Jersey, Piscataway, New Jersey, April 27, 1990.

"High voltage electron microscopic tomography (3D) of avian tendon calcification," Spring Symposium, New England Society for Electron Microscopy, Woods Hole, Massachusetts, May 11-12, 1990.

"Ultrastructure and mineralization of bone and other calcifying tissues," 6th Gordon Research Conference on Bioengineering and Orthopaedic Sciences, Andover, New Hampshire, August 6-10, 1990.

"Theories of mineralization," Department of Veterinary Science, Musculoskeletal Course, Tufts University School of Veterinary Science, Boston, Massachusetts, August 29, 1990.

"Calcification of avian tendon examined by high voltage electron microscopy and 3D image reconstruction," XXIInd European Symposium on Calcified Tissues, Vienna, Austria, March 12, 1991.

"Mineral-matrix interaction in turkey tendon: 3D-imaging and graphic reconstruction," Laboratoire d'Anatomie Compareé, Campus Jussieu, Université de Paris, Paris, France, March 22, 1991.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 1, 1991.

"Vertebrate calcification determined by high voltage electron microscopy and tomographic imaging," Department of Orthopaedics, State University of New York at Buffalo, Buffalo, New York, June 26, 1991.

"Theories of mineralization," Department of Veterinary Science, Musculoskeletal Course, Tufts University School of Veterinary Science, Boston, Massachusetts, August 28, 1991.

"Mineral and organic matrix interaction in normally calcifying tendon visualized in three dimensions by high voltage electron microscopic tomography and graphic image reconstruction," First Combined Meeting of the Orthopaedic Research Societies of USA, Japan, and Canada, Banff, Alberta, Canada, October 21-23, 1991.

"Extracellular vesicles in calcifying turkey leg tendon characterized by immunocytochemistry and high voltage electron microscopic tomography and 3-D image reconstruction," Fifth International Conference on Cell-Mediated Calcification and Matrix Vesicles, Hilton Head, South Carolina, November 16-20, 1991.

"Mineral and collagen interaction during calcification," Fourth International Conference on the Chemistry and Biology of Mineralized Tissues, Coronado Peninsula, California, February 5-10, 1992.

"Mineralization of tendon determined by high voltage electron microscopy and 3D image reconstruction," Department of Structural Biology, The Weizmann Institute of Science, Rehovot, Israel, April 1, 1992.

"Mechanism of vertebrate mineralization deduced from novel microscopic methods," Israeli Division Annual Meeting, International Association for Dental Research, Herzelia, Israel, April 2-3, 1992.

"Three-dimensional tomography of inorganic crystals and collagen fibrils at the ultrastructural level," Osgood Twenty Year Celebration, Boston, Massachusetts, April 24-25, 1992.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, May 4, 1992.

"Mineralization of collagen examined by electron microscopic-computed tomography," Department of Pathology, Combined Pathology Grand Rounds and Seminars, New England Deaconess Hospital, Boston, Massachusetts, May 18, 1992.

"High voltage electron microscopic tomography of mineralizing tendon," Texas Mineralized Tissues Society Meeting, San Antonio, Texas, May 20-23, 1992.

"Collagen mineralization examined by high-voltage electron microscopy and tomographic imaging," Center of Excellence for Materials Science Research Seminar, American Dental Association Health Foundation and the National Institute of Standards and Technology, Gaithersburg, Maryland, June 19, 1992.

"Innovative imaging methods for characterization of calcium phosphate-collagen interaction," Gordon Research Conference on Calcium Phosphates, Newport, Rhode Island, July 20-24, 1992.

"New techniques for electron microscopy: Topographic imaging and 3D image reconstruction with computer tomography. Application to particle analysis and mineralized tissues." Ultrapath VI, Biennial Conference on Diagnostic Electron Microscopy, Jackson, New Hampshire, August 2-7, 1992

"The scientific contributions of Dr. C.E. Hall to electron microscopy," Cecil Hall Symposium: The future of microscopy. 50th Annual Meeting of the Electron Microscopy Society of America, Boston, Massachusetts, August 17-21, 1992.

"A study of the mineralization of bone by high voltage electron microscopic tomography," 50th Annual Meeting of the Electron Microscopy Society of America, Boston, Massachusetts, August 17-21, 1992.

"Theories of mineralization," Department of Veterinary Science, Musculoskeletal Course, Tufts University School of Veterinary Science, Boston, Massachusetts, September 2, 1992.

"Molecular and atomic approaches to vertebrate calcification," Forsyth Dental Center, Boston, Massachusetts, September 10, 1992.

"Tomographic imaging of collagen/mineral interaction," Keynote presentation, Frontiers in Rehabilitation Medicine: Osteogenesis Imperfecta. The National Center for Medical Rehabilitation Research, National Institute of Child Health and Human Development and the National Institute of Arthritis, Musculoskeletal, and Skin Diseases, Bethesda, Maryland, September 23-25, 1992.

"Structural studies of mineralizing tissue using 3-D electron microscopic tomography," Department of Anatomy, Cornell University, Ithaca, New York, November 23, 1992.

"Structural studies of calcification using 3-D electron microscopic tomography," Department of Biological Sciences, University of Massachusetts at Lowell, Lowell, Massachusetts, December 14, 1992.

"Structural studies of calcification using 3-D electron microscopic tomography," Biomedical Engineering Seminar Series, Department of Laboratory Medicine and Pathology, University of Minnesota, Minneapolis, Minnesota, April 13, 1992.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 19, 1993.

"Evidence that collagen matrix changes affect mineralization of calcified tissues," XXIIIrd European Symposium on Calcified Tissues, Heidelberg, Germany, April 25-29, 1993.

"A new means to investigate biomineralization processes by 3-dimensional ultrastructural analysis of collagenous materials: Computed tomography of high voltage transmission electron micrographs," Symposium on 3-Dimensional Structure- and Function-Imaging in Small Volumes of Heterogeneous Systems and Materials, University of Wurzburg, Wurzburg, Germany, April 30, 1993.

'Control of calcified tissue strength occurs at the level of mineral crystal-collagen interaction: Evidence from high voltage 3D electron microscopy," Laboratoire d'Anatomie Compareé, Société Française du Tissu Conjonctif, Université de Paris 7, Paris, France, May 6, 1993.

"Advances in the structural analysis of mineralization by novel high resolution microscopy," Laboratoire de Biologie du Developpement, Université de Paris-Sud 11, Orsay Cedex, France, May 7, 1993.

"Ultrastructural and molecular aspects of bone mineralization: Advances in the structural analysis of mineralization," Gordon Research Conference on Bones and Teeth, Meriden, New Hampshire, July 12-19, 1993.

"Review of current bone cell and tissue studies," NASA Space Biology Cell Workshop, Tysons Corner, Virginia, July 22-23, 1993.

"The osteogenesis imperfecta mouse and the mechanism of matrix mineralization," Osteoarthritis Sciences, Inc., Cambridge, Massachusetts, September 2, 1993.

"Mechanisms of calcification," Grand rounds and science seminar, Department of Orthopedics, Roger Williams Hospital and Brown University, Providence, Rhode Island, September 29, 1993.

"Gene expression and formation of extracellular matrix in a primary osteoblast culture system," American Society for Gravitational and Space Biology, Crystal City, Virginia, October 21-23, 1993.

"Insight into a biological basis for the strength of calcified tissue," 40th Annual Orthopaedic Research Society Meeting, New Orleans, Louisiana, February 21, 1994.

"Collagen-mineral interaction in vertebrate calcification," Institute of Dental Research, University of North Carolina, Chapel Hill, North Carolina, March 1, 1994.

"Ultrastructure of bone and the mechanism of calcification," Harvard University, Cambridge, Massachusetts, March 22, 1994.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 25, 1994.

"The contributions to electron microscopy by Cecil E. Hall," New England Society for Electron Microscopy Spring Symposium, Woods Hole, Massachusetts, May 6, 1994.

"Collagen-based mineralization," Gordon Research Conference on Calcium Phosphates, Newport, Rhode Island, July 26, 1994.

"The structure of hydroxyapatite and its intraction with collagen in calcifying vertebrate tissues," Biomedical Engineering Society, Frontiers in Biomedical Engineering: Orthopedic Biomaterials, Tempe, Arizona, October 16, 1994.

"Initial biochemical and microscopic results obtained from embryonic chick bone cells flown during NASA shuttle mission STS-59 (STL/NIH-C1)," American Society for Gravitational and Space Biology, San Francisco, California, October 21, 1994.

"Mineralization of avian tendon mediated by vesicles and collagen: Three dimensional analysis by high voltage electron microscopic tomography and image reconstruction," 41st Annual Orthopaedic Research Society Meeting, Orlando, Florida, February 13-16, 1995.

"Ultrastructure of bone and the mechanism of mineralization," Harvard University, Cambridge, Massachusetts, March 23, 1995.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, March 27, 1995.

"Normal and abnormal vertebrate calcification: Intrinsic brittleness based on matrix-mineral interaction deduced from 3D image reconstruction," National Institute of Dental Research, Bethesda, Maryland, March 30, 1995.

"The effect of microgravity on embryonic chick bone cells: Results from NASA mission STS-59 (STL/NIH-C1)," American Institute for Aeronautics and Astronautics/NASA Life Science and Space Medicine Conference, Houston, Texas, April 3-6, 1995.

"An update of current studies of mineralization," Department of Orthopedics, University of Texas Health Science Center, San Antonio, Texas, April 6, 1995.

"On osteogenesis and the effects of microgravity on cell processes," Department of Biology, University of Massachusetts at Lowell, Lowell, Massachusetts, May 10, 1995.

"Molecular and atomic interactions of collagen and mineral in vertebrate tissues," Symposium on Biomineralization, IV International Conference on Advanced Materials, Cancún, Mexico, August 27-September 1, 1995.

"Bone mineral structure and its implications for strength," Conference on Equine Sports Medicine, Concord, Massachusetts, October 5-6, 1995.

"Mechanisms of calcification," Department of Orthopedics, Roger Williams Hospital and Brown University, Providence, Rhode Island, October 11, 1995.

"State-of-the-art presentation: Mineral characterization in invertebrates and vertebrates," Fifth International Conference on the Chemistry and Biology of Mineralized Tissues, Kohler, Wisconsin, October 21-27, 1995.

"Macromolecular structure of OI tissue," David Grice Lecture Day, Department of Orthopedic Surgery, Children's Hospital, Boston, Massachusetts, November 1, 1995.

"Nucleation of collagen in vertebrate tissues deduced from electron microscopic tomography and molecular dynamics," Department of Biochemistry, School of Dental Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, November 29, 1995.

"Current problems in biomineralization," Department of Pathology, Robert Wood Johnson Medical School, University of Medicine and Dentistry of New Jersey, Piscataway, New Jersey, November 30, 1995.

"Vertebrate mineral formation: Role of collagen and vesicles," Workshop on Biomineralization, Mizpe Ramon and Eilat, Israel, February 15-22, 1996.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, March 4, 1996.

"Three dimensional imaging of the macromolecular organization and spatial relationships of collagen, matrix vesicles, and mineral in calcified tissues," Symposium on the Physiology of Mineralized Tissues: A Morphological Viewpoint, 74th General Session of the International Association for Dental Research, San Francisco, California, March 13-17, 1996.

"Interactions of collagen and mineral in vertebrate tissues," Workshop on Synergistic Synthesis of Inorganic Materials, Tegernsee, Bavaria, Germany, March 17-22, 1996.

“Organization of crystals and collagen in bone and other calcified tissues,” Harvard University, Cambridge, Massachusetts, April 4, 1996.

“Calcification of collagen,” Department of Oral Biology, Northwestern University Dental School, Chicago, Illinois, May 2, 1996.

“High voltage tomography of vertebrate calcification,” Department of Microbiology and Immunology, Finch University of Health Sciences, Chicago Medical School, North Chicago, Illinois, May 3, 1996.

“Mineralization of bone (Part 1); Pathobiology of pediatric orthopedic conditions,” Department of Orthopaedic Surgery, Children's Hospital, Boston, Massachusetts, June 17, 1996.

“Mineralization of bone (Part 2); Pathobiology of pediatric orthopedic conditions,” Department of Orthopaedic Surgery, Children's Hospital, Boston, Massachusetts, June 20, 1996.

“Introduction to vertebrate and invertebrate mineralization,” Gordon Research Conference on Biomineralization, Plymouth, New Hampshire, August 8, 1996.

“Nucleation and growth of mineral in organic matrices of vertebrate tissues,” 212th American Chemical Society Meeting, Orlando, Florida, August 26, 1996.

“Three-dimensional ultrastructural analysis of pathologic calcium crystal deposition,” Crystal arthropathies study group. 60th national scientific meeting of the American Society of Rheumatology, Orlando, Florida, October 21, 1996.

“Chemistry of mineralized tissues,” class lecture, Department of Biochemistry, University Of Pennsylvania, School of Dental Medicine, Philadelphia, Pennsylvania, November 11, 1996.

“Apatite nucleation and growth in vertebrate tissues,” United States Department of Agriculture, North Atlantic Area Eastern Regional Research Center, Wyndmoor, Pennsylvania, November 13, 1996.

“Mechanism of vertebrate mineralization,” Department of Chemistry, University of Illinois, Urbana-Champaign, November 19, 1996.

“Mineralization of vertebrate tissues,” Department of Molecular Pharmacology, Physiology, and Biotechnology, Brown University, Providence, Rhode Island, December 6, 1996.

“Apatite identification in engineered calcified tissues,” First meeting of the Tissue Engineering Society, Orlando, Florida, December 13, 1996.

“Mineralization of bone; Pathobiology of pediatric orthopedic conditions,” Department of Orthopaedic Surgery, Children's Hospital, Boston, Massachusetts, December 23, 1996.

"Role of vesicles and collagen in vertebrate mineralization," Department of Basic and Behavioral Sciences, Northwestern University Dental School, Chicago, Illinois, February 10, 1997.

"Contemplations on mineral-matrix interactions in vertebrate tissues: Is the mineral inert?" Forsyth Dental Center, Boston, Massachusetts, February 20, 1997.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, March 3, 1997.

"Organization of crystals and collagen in bone and other calcified tissues," Harvard University, Cambridge, Massachusetts, April 3, 1997.

"Mineralization of bone; Pathobiology of pediatric orthopedic conditions," Department of Orthopaedic Surgery, Children's Hospital, Boston, Massachusetts, May 5, 1997

"3D tomography and high voltage electron microscopy of biomineralization," Department of Radiology, Southwestern Medical School, Dallas, Texas, May 6, 1997.

"Project proposals," National Space Biomedical Research Institute, NASA/Johnson Space Center, Houston, Texas, May 8, 1997.

"Mechanisms of calcification," Department of Orthopedics, Roger Williams Hospital and Brown University, Providence, Rhode Island, September 24, 1997.

"Connective tissue structure and function analyzed by 3D imaging," David Grice Lecture Day, Department of Orthopedic Surgery, Children's Hospital, Boston, Massachusetts, October 3, 1997.

"Insight into the chemical and structural basis of bone strength," Department of Biochemistry, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio, November 14, 1997.

"Chemistry of mineralized tissues," class lecture, Department of Biochemistry, University of Pennsylvania, School of Dental Medicine, Philadelphia, Pennsylvania, November 18, 1997.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, March 2, 1998.

"Mineralization of bone; Pathobiology of pediatric orthopedic conditions," Department of Orthopaedic Surgery, Children's Hospital, Boston, Massachusetts, March 9, 1998.

"Structural basis for bone strength derived from microscopic tomography (3D) of normal and brittle tissues," University of California at San Francisco, San Francisco, California, April 2, 1998.

"Perspectives on vertebrate mineralization," Department of Aerospace Sciences, University of Colorado, Boulder, Colorado, April 15, 1998

"Current experiments on the effects of microgravity and hypergravity on bone cells," NASA/Ames Research Center, Moffett Field, California, April 16, 1998.

"The nature of calcium phosphate in mineralizing vertebrate tissues," invited presentation. XIVth International Conference on Phosphorus Chemistry, Cincinnati, Ohio, July 14, 1998.

"Structure and chemical nature of phalanges formed by tissue engineering," Biomedical Engineering Society, Annual Fall Meeting, Cleveland, Ohio, October 13, 1998.

"Collagen-mediated mineralization in vertebrates," invited presentation. American Society for Gravitational and Space Biology, Houston, Texas, October 29, 1998.

"Electron microscopic tomography," Workshop on new techniques in biological research. Sixth Intl Conf Chemistry and Biology of Mineralized Tissues, Vittel, France, November 2, 1998.

"Enamel formation determined by tomographic (3D) image reconstruction," Workshop on enamel. Sixth Intl Conf Chemistry and Biology of Mineralized Tissues, Vittel, France, November 3, 1998.

"Studies of adhesion and signal transduction through localization of bone proteins by 3D immunocytochemistry," Sixth Intl Conf Chemistry and Biology of Mineralized Tissues, Vittel, France, November 4, 1998.

"Analysis of ultrastructure by 3-dimensional tomography: Enamel and integrins," invited presentation. Midwest Connective Tissue Workshop, Rush Medical College, Rush-Presbyterian-St. Luke's Medical Center, Chicago, Illinois, November 20, 1998.

"Collagen mediates bone loss in spaceflight," Department of Biological Sciences, Northern Illinois University, DeKalb, Illinois, January 28, 1999.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, February 22, 1999.

"Tissue engineering of phalanges and joints," Polymer science working group, University of Akron, Akron, Ohio, March 26, 1999.

"Phalanges and joints formed by tissue engineering," Basic Science Lecture Series, Department of Orthopaedic Surgery (Children's Hospital Medical Center, Akron General Medical Center, and Akron City Hospital), Children's Hospital Medical Center, Akron, Ohio, April 7, 1999.

"Bone cell cultures in spaceflight," Department of Biomedical Engineering, Cleveland Clinic Educational Foundation, Cleveland, Ohio, April 29, 1999.

"The role of type I collagen in vertebrate mineralization," Department of Biomedical Engineering, Cleveland Clinic Educational Foundation, Cleveland, Ohio, April 30, 1999.

"Tissue engineering of joints," Soft tissue interest group, Akron General Medical Center, Akron, Ohio, May 19, 1999.

"Tissue engineering of phalanges and joints," Microscopy Society of Northeast Ohio, John Carroll University, Cleveland, Ohio, May 19, 1999.

"Development of cartilage and bone during formation of phalanges by tissue engineering," invited presentation. Microscopy and Microanalysis 1999, Portland, Oregon, August 2, 1999.

"Tissue engineered phalanges and small joints," invited presentation. Tissue Engineering/ Regenerative Healing/Stem Cell Biology Conference. Cambridge Healthtech Institute, Pittsburgh, Pennsylvania, October 4, 1999.

"Recent progress in tissue engineering and molecular pathology," invited presentation, Department of Radiology, Southwestern Medical School, Dallas, Texas, November 3, 1999.

"Tissue engineering of phalanges and joints," invited presentation. Midwest Connective Tissue Workshop, Rush Medical College, Rush-Presbyterian-St. Luke's Medical Center, Chicago, Illinois, November 6, 1999.

"Gene expression of cultured osteoblasts subjected to hypergravity," American Society for Gravitational and Space Biology, Seattle, Washington, November 12, 1999.

"Chemistry of mineralized tissues," class lecture, Department of Biochemistry, University of Pennsylvania, School of Dental Medicine, Philadelphia, Pennsylvania, November 24, 1999.

"Formation of phalanges and joints by tissue engineering," invited presentation. Department of Biochemistry, University of Pennsylvania, School of Dental Medicine, Philadelphia, Pennsylvania, November 24, 1999.

"Vertebrate mineralization and its response to loading and unloading," invited presentation, First Annual Orthopaedics Research Day, Department of Orthopaedics, Case Western Reserve University, Cleveland, Ohio, January 28, 2000.

"A tissue-engineered model of human phalanges and joints," invited presentation, First Annual Orthopaedics Research Day, Department of Orthopaedics, Case Western Reserve University, Cleveland, Ohio, January 29, 2000.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, February 28, 2000.

"Constructing models of human phalanges and joints by tissue engineering and potential effects of mechanical forces on them," invited presentation, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio, March 2, 2000.

"Fibrin glue application for promoting osteogenesis in vitro and in vivo," invited presentation, Wound healing and soft tissue interest group, Akron General Medical Center, Akron, Ohio, March 21, 2000.

"Mineralization and fabrication of phalanges and small joints by tissue engineering," invited presentation. Departments of Biochemistry, Pathology and Orthopaedics, Rush Medical College at Rush-Presbyterian-St. Luke's Medical Center, Chicago, Illinois, May 11, 2000.

"Structural and molecular studies of vertebrate mineralizing tissues," invited presentation. Department of Orthodontics, University of Illinois, at Chicago, Chicago, Illinois, July 12, 2000.

"Tissue engineering," invited presentation, Ohio Orthopaedic Society, Canton, Ohio, July 21, 2000.

"Aspects of organic-inorganic interaction in bone mineralization," special lecture, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio, September 8, 2000.

"Collagen and its role in mineralization: Structural and molecular studies of osteoblasts under normal gravity and spaceflight conditions," invited presentation, Kinki University Medical School, Osaka, Japan, September 13, 2000.

"Advances in structural and molecular studies of vertebrate mineralizing tissues," invited presentation, XVth International Symposium on Morphological Sciences, Kyoto, Japan, September 19, 2000.

"Bone research at NEOUCOM: Tissue engineering and NASA flights," invited presentation, Brown Bag Lunch Series, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio, October 4, 2000.

"Tissue engineering design toward orthopedic injury and repair," invited presentation, Akron General Medical Center Health and Wellness Facility, Akron, Ohio, November 1, 2000.

"Orthopedic tissue engineering," special lecture, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio, December 1, 2000.

"Cell development in tissue-engineered phalanges and joints," seminar, Department of Biochemistry and Molecular Pathology, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio, December 6, 2000.

"Isolation of single cells for molecular analysis: Studies of bone tissue by novel laser capture microdissection," invited presentation, Wound healing research interest group, Akron General Hospital, Akron, Ohio, December 13, 2000.

"Effects of gravitational changes on gene expression of cultured osteoblasts," invited presentation, 2001 NASA Cell Science Conference, Houston, Texas, March 7, 2001.

"The potential for replacement of human digits and joints," invited presentation, University of Akron Human Genome Odyssey Conference, Akron, Ohio, April 6, 2001.

"Adaptation of cultured osteoblasts following changes in gravitational force," invited presentation, NASA Glenn Research Center, Cleveland, Ohio, April 13, 2001.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 16, 2001.

"Identification of cell types in growing tissue-engineered phalanx-joint constructs of bovine origin implanted in nude mice," invited presentation, Midwest Tissue Engineering Consortium, Cleveland, Ohio, April 21, 2001.

"Musculoskeletal tissue engineering," Basic Science Lecture Series, Department of Orthopaedic Surgery (Children's Hospital Medical Center, Akron General Medical Center, and Akron City Hospital), Children's Hospital Medical Center, Akron, Ohio, May 23, 2001.

"Bone and cartilage growth and development in the brilliance of 3D microscopy, molecular biology, and laser light," invited presentation, Rush Medical College at Rush-Presbyterian-St. Luke's Medical Center, Chicago, Illinois, July 25, 2001.

"Effects of spaceflight on cultured bone cells," invited presentation, Microscopy and Microanalysis 2001, Long Beach, California, August 7, 2001.

"Gravitational modulation of osteogenic markers in chick bone cell cultures," invited presentation. Gravitational Biology of Avian Systems, Purdue University, West Lafayette, Indiana, September 7, 2001.

"Application of laser capture microdissection to studies of vertebrate mineralizing tissues," invited presentation, Molecular biology and pathology of bone working group: Strategies for defining molecular based lesions in skeletal tissues. American Society for Bone and Mineral Research, 23rd annual meeting, Phoenix, Arizona, October 13, 2001.

"Localization and possible role of osteopontin in mouse growth plate cartilage as deduced from laser capture microdissection and molecular analysis," invited seminar, University of Western Ontario, London, Ontario, Canada, October 26, 2001.

"Insight into the role of osteopontin deduced from laser capture microdissection of mouse growth plate cartilage," Seventh International Conference on the Chemistry and Biology of Mineralized Tissues, Ponte Vedra Beach, Florida, November 8, 2001.

"Gene expression in bone and cartilage cells: Laser capture microdissection and quantitative RT-PCR," seminar, Department of Biochemistry and Molecular Pathology, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio, November 28, 2001.

"The structure and function of normally mineralizing avian tendons," invited presentation, Society for Integrative and Comparative Biology, Anaheim, California, January 5, 2002.

"Status of a tissue-engineered phalanx model: Is it a mouse, cow, or human? In situ hybridization studies," invited presentation, Wound healing and soft tissue interest group, Akron General Medical Center, Akron, Ohio, February 19, 2002.

"Mineralized collagen: The model in vivo for biomimetic application," invited presentation, United Engineering Foundaton Conference on Biomimetic Engineering, Sandestin, Florida, March 4, 2002.

"In vivo and ex vivo characterization of biomaterials," invited tutorial presentation, Materials Research Society, San Francisco, California, April 1, 2002.

"Gene expression of a tissue engineered model of human phalanges and small joints examined by in situ hybridization," invited presentation, Materials Research Society, San Francisco, California, April 1, 2002.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 15, 2002.

"Potential of tissue engineering in orthopaedics," invited presentation, Acrylic Bone Cement in the New Millenium: A 40th Anniversary Symposium, Chancellor's Centre, University of Manchester, Manchester, England, (September 18, 2001) May 14, 2002.

"Biomechanical implications of mineralizing collagen," invited presentation, Department of Biomedical Engineering, Stanford University, Stanford, California, May 21, 2002.

"Living with gravity: The earth, moon, and saturn and the role of collagen in bone formation and maintenance," invited presentation, NASA/Redstone Research Center, Huntsville, Alabama, July 10, 2002.

"Vascularity of a tissue-engineered model of human phalanges," invited presentation, Microscopy and Microanalysis 2002, Quebec City, Quebec, Canada, August 7, 2002.

"Introduction to biomechanics," invited presentation, Gordon Research Conference on Biomineralization, Colby-Sawyer College, New London, New Hampshire, August 14, 2002.

"Organic/inorganic interaction in the vertebrate skeleton," invited presentation, Biomimetics III Conference on the Nature of Protein/Inorganic Interfaces, Friday Harbor Marine Laboratory, San Juan Island, Washington, August 28, 2002.

"Advances in molecular and structural studies of bone and cartilage: From NASA shuttle flights to tissue engineering," invited presentation, Department of Orthopaedics, Johns Hopkins School of Medicine, Baltimore, Maryland, September 26, 2002.

"The potential of tissue engineering in plastic surgery, orthopaedics, and other medical specialities" invited keynote presentation, 11th Research Council Meeting of Japan Society of Plastic and Reconstructive Surgery, Sendai, Japan, October 3, 2002.

"Tissue engineering of bone and cartilage in models of human phalanges, small joints, and ear," invited presentation, Department of Plastic and Reconstructive Surgery, Kinki University School of Medicine, Osaka, Japan, October 7, 2002.

"Laser capture microdissection: A novel approach to the analysis of gene expression and protein secretion for biological and materials science applications," invited presentation, Microscope Society for Northeast Ohio, Noveon, Inc., Brecksville, Ohio, October 23, 2002.

"Gene expression studies of isolated bone and cartilage cells using laser capture microdissection," invited presentation, Department of Pathology, Mt. Sinai Hospital, Toronto, Ontario, Canada, November 13, 2002.

"Chemistry of mineralized tissues," class lecture, Department of Biochemistry, University of Pennsylvania, School of Dental Medicine, Philadelphia, Pennsylvania, November 25, 2002.

"Gene expression of bone and cartilage cells determined by laser capture microdissection," invited presentation, Department of Orthopaedics, Jefferson Medical College, Philadelphia, Pennsylvania, November 25, 2002.

"Knee bone connected to the thigh bone, thigh bone connected to the hip bone….Novel aspects of skeletal biochemistry," invited presentation, American Medical and Graduate Departments of Biochemistry, San Jose, Costa Rica, January 17, 2003.

"Tissue engineering of bones and joints," invited presentation, School of Dental Medicine, University of Southern California, Los Angeles, California, February 27, 2003.

"Tissue engineering with osteoblasts, chondrocytes, and tenocytes for fingers, joints, and ears: Analyses by microscopy, laser capture microdissection and in situ hybridization," invited presentation, Interdisciplinary Graduate Program in Biomolecular Science and Engineering, University of California at Santa Barbara, Santa Barbara, California, February 28, 2003.

"Tissue engineering of auricular cartilage using chondrocyte-seeded poly(L-lactide-ε-caprolactone) scaffolds," seminar, Department of Biochemistry and Molecular Pathology, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio, March 12, 2003.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 14, 2003.

"Tissue engineering methods and approaches for hard tissues," invited tutorial presentation, Materials Research Society, San Francisco, California, April 20, 2003.

"Effect of mechanical force on the development of a novel tissue-engineered model of human phalanges," invited presentation, Materials Research Society, San Francisco, California, April 21, 2003.

"The application of tissue engineering for reconstruction of human connective tissues," invited keynote presentation, Japan Society of Teratology, Osaka, Japan, July 3, 2003.

"Tissue engineering of mineralized connective tissues," invited presentation, Georgia Medical College, Augusta, Georgia, July 17, 2003.

"Laser capture microdissection as a novel tool for biochemical studies complementing structural analyses," invited presentation, Technology Forum, Microscopy and Microanalysis 2003, San Antonio, Texas, August 4, 2003.

"Potential of tissue engineering in medicine," invited presentation, University of Delaware, Newark, Delaware, November 5, 2003.

"Current studies of mineralization," seminar, Department of Biochemistry and Molecular Pathology, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio, February 19, 2004.

"Tissue engineering of a model of human phalanges and a small joint," invited presentation, Department of Orthopaedics, Vanderbilt University Medical School, Nashville, Tennessee, February 27, 2004.

"How to write a scientific paper," invited presentation, Biomedical Research Interest Group, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio, April 12, 2004.

"Tissue-engineering bone and cartilage: Gene expression analysis by laser capture microdissection and quantitative RT-PCR," invited presentation, School of Dentistry, University of Michigan, Ann Arbor, Michigan, April 21, 2004.

"Theories of mineralization," Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 26, 2004.

"Laser capture microdissection of bone and cartilage: Gene expression studies complementing structural analyses," invited presentation, New England Society for Microscopy, Spring Symposium, Woods Hole, Massachusetts, April 30, 2004.

"Design and assessment of a tissue-engineered model of human phalanges and a small joint," invited presentation, Conferences on Orthodontic Advances in Science and Technology (COAST): Craniofacial Skeletal Bioengineering, second biennial conference, Asilomar Conference Center, Pacific Grove, California, August 29, 2004.

"Tissue engineering a human ear model," invited presentation, Midwest Connective Tissue Workshop, Case Western Reserve University, Cleveland, Ohio, September 11, 2004.

"Tissue engineering," invited presentation, grand rounds basic science program for residents in orthopedic surgery at Akron City Hospital, Children's Hospital Medical Center of Akron, and Akron General Medical Center, Children's Hospital Medical Center of Akron, Akron, Ohio, October 6, 2004.

"Tissue engineering of a model of the human ear," invited presentation, Wound Healing Consortium of Northeast Ohio, Summa Health Systems, Akron City Hospital, Akron, Ohio, December 7, 2004.

"Tissue engineering of a human ear model," Scholars in Dentistry seminar, School of Dentistry, University of Washington, Seattle, Washington, February 17, 2005.

"Tissue-engineered design and assessment of a model of human phalanges and a small joint," invited presentation, School of Dental Medicine and the McGowan Institute of Regenerative Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania, March 17, 2005.

"Tissue engineering of models of human phalanges and a small joint," invited presentation, University of Connecticut Health Sciences Center, Farmington, Connecticut, April 11, 2005.

"Theories of mineralization," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 18, 2005.

"Matrix:mineral interactions in vertebrate calcifying tissues," invited presentation, Symposium on Bone Quality: What is it and can we measure it? National Institute for Arthritis and Musculoskeletal and Skin Diseases, American Society for Bone and Mineral Research, National Institute of Biomedical Imaging and Bioengineering and the French Institute of Health and Medical Research, Bethesda, Maryland, May 2, 2005.

"Tissue engineering of models of human phalanges and a small joint," invited presentation, Department of Biophysics and Molecular Biology, University of Chicago, Chicago, Illinois, May 10, 2005.

"Tissue engineering," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, May 23, 2005.

"Mineral formation in vertebrate tissues," invited presentation, Department of Oral Biology, University of Connecticut Health Center, Farmington, Connecticut, July 14, 2005.

"Biomineralization," invited speaker, Meet-the-Professor series, American Society for Bone and Mineral Research, Nashville, Tennessee, September 26, 2005.

"Advances in tissue engineering of human digit and ear models," invited presentation, Department of Biochemistry, Rush University Medical School, Chicago, Illinois, February 16, 2006.

"Tissue engineering of models of human digits and ear," invited seminar, Department of Biology, University of Akron, Akron, Ohio, April 6, 2006

"Advances in tissue engineering of model human digits and the ear," invited presentation, Case Western Reserve University/Cleveland Clinic Foundation Musculoskeletal Seminar Series, Case School of Medicine, Cleveland, Ohio, April 13, 2006.

"Theories of mineralization," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 17, 2006.

"Advances in tissue engineering human digit and ear models," invited presentation, Wound Healing Consortium of Northeast Ohio and the Departments of Polymer Science and Biomedical Engineering, University of Akron, Akron, Ohio, April 27, 2006.

"Tissue engineering," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, May 15, 2006.

"Bone and cartilage tissue engineering," invited presentation, Gordon Conference on Biomineralization, New London, New Hampshire, August 2, 2006.

"Tissue engineering of models of human digits and ears," invited presentation, Life Sciences Division, NASA/Ames Research Center, Moffett Field, CA, September 7, 2006.

"Use of bovine or human chondrocytes to advance tissue-engineered models of a human digit or ear," invited presentation, Midwest Connective Tissue Workshop, Rush University Medical Center, Chicago, Illinois, October 21, 2006.

"Effect of gravity on cultured bone cells," invited presentation, MSA National Tour Speaker, annual meeting of the New York Society of Experimental Microscopists and the New York Microscopical Society, Museum of Natural History, New York, New York, January 25, 2007.

"The mechanism of mineralization in bone and calcifying cartilage," invited presentation, Department of Plastic and Reconstructive Surgery, Kinki University School of Medicine, Osaka, Japan, February 22, 2007.

"Use of bovine or human chondrocytes to advance tissue-engineered models of a human digit or ear," invited presentation, High-Tech Research Symposium, Kinki University School of Medicine, Osaka, Japan, February 23, 2007.

"Effect of gravity on cultured bone cells," invited presentation, MSA National Tour Speaker, 2007 Annual Joint Symposium and Exhibition, Florida Chapter of the AVS Science and Technology Society and the Florida Society for Microscopy, University of Central Florida, Orlando, Florida, March 13, 2007.

"Human chondrocyte-seeded tissue-engineered scaffolds and OP-1 effects," 85th General Session of the International Association of Dental Research, New Orleans, Louisiana, March 23, 2007.

"Theories of mineralization," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 9, 2007.

"Mechanism of mineral formation in vertebrates," invited presentation, MSA National Tour Speaker, Joint Spring Meeting, Indiana Microscopy Society and Central States, Midwest and Iowa Microscopy Societies, Indiana School of Medicine, Indianapolis, Indiana, April 20, 2007.

"It was the best of times – On the road to discovery of collagen-mineral interaction," invited presentation, Celebration of the Scientific Accomplishments of Dr. Melvin J. Glimcher, Harvard Medical School, Boston, Massachusetts, May 4, 2007.

"Tissue engineering," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, May 14, 2007.

"Mechanism of mineral formation in vertebrates," invited presentation, MSA National Tour Speaker, 50th Anniversary Meeting, Midwest Microscopy and Microanalysis Society, McCrone Institute, Westmont, Illinois, September 19, 2007.

"Advances in tissue engineering and analysis of a model human digit," invited presentation, Microscope Society of Northeast Ohio, GrafTech International, Ltd., Parma, Ohio, October 23, 2007.

"Gene expression and structure of cultured osteoblasts subjected to increased gravity," invited presentation, American Society for Gravitational and Space Biology, NASA/Ames Research Center, Moffett Field, California, October 27, 2007.

"Mineral deposition in the extracellular matrices of vertebrate tissues: Identification of possible apatite nucleation sites on type I collagen," invited presentation, Ninth International Conference on the Chemistry and Biology of Mineralized Tissues, Austin, Texas, November 5, 2007.

"Advances in tissue engineering models of human digits: Mediation of growth plate cartilage by periosteum," invited presentation, Ninth International Conference on the Chemistry and Biology of Mineralized Tissues, Austin, Texas, November 8, 2007.

"Advances in tissue engineering models of human digits," invited seminar, Biomedical Engineering Program Grand Rounds, Department of Biomedical Engineering, University of British Columbia, Vancouver, British Columbia, Canada, November 13, 2007.

"Advances in tissue engineering models of human digits," invited seminar, Department of Chemistry, Kent State University, Kent, Ohio, November 20, 2007.

"Advances in tissue engineering models of human digits," invited presentation, Department of Orthopedics, Case Western Reserve University, Cleveland, Ohio, November 27, 2007.

"Recent analytical studies of orthopedic pathologies," invited seminar, Department of Integrative Medical Sciences, Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Rootstown, Ohio, January 8, 2008.

"Tissue engineering of model human digits," invited presentation, MSA National Tour Speaker, Northern Arizona Microscopy Society, Flagstaff, Arizona, April 17, 2008.

"Theories of mineralization," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 21, 2008.

"An introduction to tissue engineering with some clinical and basic science applications," invited keynote address, Internal Medicine Residency Research Day, Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Rootstown, Ohio, April 23, 2008.

"Orthopaedic tissue engineering," keynote address, Midwest Orthopaedic Research and Education Foundation, annual meeting, Health and Wellness Center, Akron, Ohio, April 24, 2008.

"Tissue engineering," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 28, 2008.

"Identification of possible apatite nucleation sites associated with type I collagen," invited lecture, Symposium in Honor of Dr. Jaro Sodek, The Faculty Club, University of Toronto, Toronto, Canada, May 2, 2008.

"Collagen-mediated mineral formation," invited presentation, Department of Oral Biology, University of Missouri at Kansas City, Kansas City, Missouri, June 2, 2008.

"Tissue engineering a functional human digit," invited presentation, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio, September 25, 2008.

"Biomaterials applications in orthopedic tissue engineering and wound healing," invited presentation, Symposium on Biomaterials in Wound Healing, Heal Ohio 2008, Sheraton Suites Hotel, Cuyahoga Falls, Ohio, October 2, 2008.

"The Orthopaedic Cluster of Northeastern Ohio and tissue engineering," invited presentation, University of Akron Retirees Association, University of Akron, Akron, Ohio, October 8, 2008.

"Tissue engineering design and approaches in medicine," invited presentation, Symposium on Practical Approaches to Sports Medicine, Health and Wellness Center, Akron, Ohio, December 5, 2008.

"Protein-ion interaction as the basis for mineral formation by collagen in bones and teeth," invited seminar, Department of Integrative Medical Sciences, Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Rootstown, Ohio, April 2, 2009.

"Theories of mineralization," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 7, 2009.

"Influence of scaffold composition on gene expression and cellular organization in tissue-engineered middle phalanx models of human digits," invited presentation, Materials Research Society spring meeting, San Francisco, California, April 14, 2009.

"Formation of mineral by type I collagen in bone," keynote address, 2nd Annual Meeting, Midwest Orthopaedic Research and Education Foundation, Children's Hospital of Akron, Akron, Ohio, April 17, 2009.

"Mineral nucleation sites mediated by type I collagen," invited presentation, Department of Orthopaedics, University of Washington, Seattle, Washington, April 21, 2009.

"Tissue engineering a model of the human phalanx," invited presentation, Department of Orthopaedics, Children's Hospital, Seattle, Washington, April 22, 2009.

"Tissue engineering," invited lecture, Oral Biology, Connective Tissue Course, Harvard School of Dental Medicine, Boston, Massachusetts, April 28, 2009.

"Modeling possible mineral nucleation sites on type I collagen," invited presentation, Midwest Connective Tissue Workshop, Rush University, Chicago, Illinois, May 8, 2009.

"Mineral formation by type I collagen in bone," invited presentation, Max Planck Institute, Potsdam, Germany, May 12, 2009.

"Tissue-engineering models of the human digit," invited presentation, Max Planck Institute, Potsdam, Germany, May 13, 2009.

"Mineral formation by type I collagen in bone," invited presentation, University of Regensburg, Regensburg, Germany, May 18, 2009.

"Current development of a tissue-engineered model of human phalanges," invited presentation, Departments of Orthopaedics and Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio, September 15, 2009.

"Formation of mineral by collagen in bones and teeth," invited seminar, Department of Chemistry, University of Akron, Akron, Ohio, October 6, 2009.

"Advances in medicine – tissue engineering models of human digits, ears and the knee," invited presentation, Akron section, American Society of Mechanical Engineers, Canton, Ohio, November 12, 2009.

"Current development of a tissue-engineered model of human phalanges," invited seminar, Department of Polymer Science, University of Akron, Akron, Ohio, December 4, 2009.

"Current understanding of the mechanism of bone mineralization," class lecture, Department of Geoscience, University of Wisconsin, Madison, Wisconsin, March 18, 2010.

"Current development of a tissue-engineered model of human phalanges," invited seminar, Materials Science Program, University of Wisconsin, Madison, Wisconsin, March 18, 2010.

"Tissue engineering of models of human digits and ears," invited keynote presentation, MSA National Tour Speaker, Central States Microscopy and Microanalysis Society, Stowers Institute of Medical Research, Kansas City, Kansas, April 30, 2010.

"Advances in medicine – tissue engineering models of human digits, ears and the knee," invited presentation, ACESS Honors and Awards Banquet, Akron, Ohio, November 4, 2010.

NIH Study Section Conferences:

NIH General Medicine B Study Section, Conference Call, December 12, 1989.

NIH General Medicine B Study Section, On-site meeting, Chevy Chase, Maryland, June 3-4, 1991.

NIH General Medicine B Study Section, Conference Call, August 1, 1991.

NIH Chemistry and Related Sciences, special emphasis panel, Conference Call, February 17, 1998.

NIH Skeletal Muscle Biology, special emphasis panel, Conference Call, March 25, 2002.

NIH Advanced Biomaterials, special emphasis panel, On-site meeting, Chevy Chase, Maryland, August 24-25, 2003.

NIH Mechanisms of Mineralization in Bone, chair of special emphasis panel, On-site meeting, Bethesda, Maryland, March 19, 2004.

Workshops:

NASA Space Biology Cell Workshop, Tysons Corner, Virginia, July 22-23, 1993.

Newspaper and other Articles:

"An American hero in space," Akron Beacon Journal, Akron, Ohio, October 25, 1998.

"Along the way," Record-Courier, Ravenna-Kent, Ohio, October 25, 1998.

"Researchers excited about shuttle flight," Record-Courier, Ravenna-Kent, Ohio, October 28, 1998.

"Scientists develop way to 'grow' fingers, toes," Akron Beacon Journal, Akron, Ohio, April 8, 1999.

"Lab work points to the future," Plain Dealer, Cleveland, Ohio, April 8, 1999.

"Joint-shaped tissue grown in laboratory," Plain Dealer, Cleveland, Ohio, April 8, 1999.

"Doctor: Study paves way for growing joints," Vindicator, Youngstown, Ohio, April 8, 1999.

Denver Post, Denver, Colorado, April 13, 1999 (syndicated story, Knight-Ridder).
"Bioengineers grow human finger joint," Las Vegas Review-Journal, Las Vegas, Nevada, April 13, 1999

"Medical research team 'grows' a new finger joint," Salt Lake Tribune, Salt Lake City, Utah, April 29, 1999

"Tissue engineering project fabricates first joint: NEOUCOM scientist co-authors project," Mahoning Medical Society Bulletin, Ohio, Spring, 1999.

"Trends in tissue engineering research," by Rathin C. Das, BioBusiness, 2000.

"Manmade tissue no longer stuff of sci-fi," The Medical Post News, September 7, 2000.

"Tissue innovators at college," Record-Courier, Ravenna, Ohio, March 17, 2003.

"Along the way," Record-Courier, Ravenna, Ohio, April 4, 2003.

"Local research may ease pain in our future," Akron Beacon Journal, Akron, Ohio, February 3, 2008.

"Experts plan to share ideas on wound care," Akron Beacon Journal, Akron, Ohio, September 22, 2008, and Ohio.com (www.ohio.com/news/29205084.html), September 24. 2008.

"Healing potential: Adult stem cells may be useful for wounds," Modern Medicine – Dermatology Times, August 4, 2009.

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Original Reports

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2. Landis WJ, Paine MC, Glimcher MJ. Electron microscopic observations of bone tissue prepared anhydrously in organic solvents. J Ultrastruct Res 1977;59:1-30.

3. Landis WJ, Hauschka BT, Rogerson CA, Glimcher MJ. Electron microscopic observations of bone tissue prepared by ultracryomicrotomy. J Ultrastruct Res 1977;59:185-206.

4. Landis WJ. X-ray microanalysis of calcium phosphate solids prepared anhydrously as calibration standards for mineralized tissues. In: Beaman DR, Ogilvie RE, Wittry DB, eds. Eighth international congress on x-ray optics and microanalysis. Midland, MI: Pendell Publishing, 1980:497-500.

5. Landis WJ, Glimcher MJ. Electron diffraction and electron probe microanalysis of the mineral phase of bone tissue prepared by anhydrous techniques. J Ultrastruct Res 1978;63:188-223.

6. Roufosse AH, Landis WJ, Sabine W, Glimcher MJ. Identification of brushite in newly deposited bone mineral from embryonic chicks. J Ultrastruct Res 1979;68:235-255.

7. Landis WJ, Paine MC, Glimcher MJ. Use of acrolein vapors for the anhydrous preparation of bone tissue for electron microscopy. J Ultrastruct Res 1979;70:171-180.

8. Glimcher MJ, Bonar LC, Grynpas MD, Landis WJ, Roufosse AH. Recent studies of bone mineral: Is the amorphous calcium phosphate theory valid? J Crystal Growth 1981;53:100-119.

9. Geraudie J, Landis WJ. The fine structure of the developing pelvic fin dermal skeleton in the trout *Salmo gairdneri*. Am J Anat 1982;163:141-156.

10. Landis WJ, Glimcher MJ. Electron optical and analytical observations of rat growth plate cartilage prepared by ultracryomicrotomy: The failure to detect a mineral phase in matrix vesicles and the identification of heterodispersed particles as the initial solid phase of calcium phosphate deposited in the extracellular matrix. J Ultrastruct Res 1982;78:227-268.

11. Landis WJ, Grynpas MD, Latanision RM, Martin JR. Mineralized biological tissues studied by Auger electron and x-ray photoelectron spectroscopy. In: Heinrich KFJ, ed. Microbeam analysis - 1982. San Francisco: San Francisco Press, 1982:121-127.

12. Grynpas MD, Etz ES, Landis WJ. Studies on calcified tissues by Raman microprobe analysis. In: Heinrich KFJ, ed. Microbeam analysis - 1982. San Francisco: San Francisco Press, 1982:333-337.

13. Landis WJ, Navarro M. Correlated physicochemical and age changes in embryonic bovine enamel. Calcif Tissue Intl 1983;35:48-55.

14. Landis WJ. Studies of mineralizing tissues using anhydrous techniques for electron optical and microprobe analyses. J Bone Joint Surg 1983 (Kappa Delta Award).

15. Seltzer SE, Davis MA, Adams DF, Shulkin PM, Landis WJ, Havron A. Liposomes carrying diatrizoate: Characterization of biophysical properties and imaging applications. Investigative Radiology 1984;19:142-151 (1984 Stauffer Award).

16. Landis WJ, Sanzone CF, Brickley-Parsons D, Glimcher MJ. Radioautographic visualization and biochemical identification of O-phosphoserine- and O-phosphothreonine-containing phosphoproteins in mineralizing embryonic chick bone. J Cell Biol 1984;98:986-990.

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19. Grynpas MD, Landis WJ, Pritzker KPH. Milk of calcium: A structural study. In: Johari O, ed. Scanning electron microscopy/1984/IV. AMF O'Hare, IL: SEM, Inc, 1984:1765-1770.

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26. Landis WJ. A study of calcification in the leg tendons from the domestic turkey. J Ultrastruct and Mol Struct Res 1986;94:217-238.

27. Landis WJ, Paine MC, Hodgens KJ, Glimcher, MJ. Matrix vesicles in embryonic chick bone: Considerations of their identification, number, distribution, and possible effects on calcification of extracellular matrices. J Ultrastruct and Mol Struct Res 1986;95:142-163.

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XXVII collagen at the transition of cartilage to bone during skeletogenesis. Bone 2007;41:535-542.

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99. Scharschmidt T, Jacquet R, Laskovski J, Lowder E, Weiner S, Landis WJ. Analysis of human osteoarthritic connective tissue by laser capture microdissection and QRT-PCR. Connect Tissue Res 2007;48:316-323 (Journal cover image).

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Review Articles

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149. Fernandes R, Scott M, Wada Y, Jacquet R, Lowder E, Isogai N, Weis M, Eyre D, Landis W. Collagen heteropolymer formation and matrix assembly in tissue-engineered cartilage: A model of the human phalanx. Orthopedic Research Society, San Francisco, CA, February, 2008.

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151. Bries A, Askew M, Weiner D, Adamczyk M, Horton W, Landis W. A study in vivo of the effects of a static mechanical load on the proximal tibial physis in rabbits. Midwest Resident Research Competition and Symposium, Akron, OH, April, 2008.

152. Laskovski J, Scharschmidt T, Jacquet R, Weiner S, Landis W. Analysis of human osteoarthritic connective tissue by laser capture microdissection and QRT-PCR. Ohio Orthopaedic Society, Columbus, OH, May, 2008.

153. Scharschmidt T, Weiner D, Landis W, Schrickel T, Jacquet R, Lowder E. Evaluation of gene expression in slipped capital femoral epiphysis utilizing laser capture microdissection and RT-PCR. American Orthopaedic Association, Quebec City, Quebec, Canada, June, 2008.

154. Schoenfeld AJ, Jacquet RD, Lowder EM, Isogai N, Landis WJ. Estimation of the biochemical composition of tissue-engineered menisci developed from human meniscal cells using QRT-PCR. Orthopaedic Research Society, San Francisco, CA, February, 2009.

155. Isogai N, Enjo M, Ikada Y, Jacquet R, Lowder E, Landis WJ. Tissue engineering a human ear model following seeded of different chondrocytes. Tissue Engineering and Regenerative Medicine International Society, San Diego, CA, December, 2008.

156. Landis WJ, Wada Y, Jacquet R, Lowder E, Isogai N. Influence of scaffold composition on gene expression and cellular organization in tissue-engineered middle phalanx models of human digits. Materials Research Society, San Francisco, CA, April, 2009.

157. Bries A, Horton Jr W, Landis W, Adamczyk M, Askew M, Jacquet R, Morscher M, Weiner D. A study in vivo of the effects of a static compressive load on the proximal tibial physis in rabbits. Cleveland Orthopaedic Society, Cleveland, OH, January, 2009 (3^{rd} place award, orthopaedic resident essay contest).

158. Bries A, Jacquet R, Lowder E, McBurney D, Landis WJ, Adamczyk MJ, Steiner R, Askew M, Horton Jr WE, Horne W, Morscher M, Weiner DS. A study in vivo of the effects of a static compressive load on the proximal tibial physis in rabbits. Mt. Sinai Barry Friedman Award competition. Cleveland, OH, March, 2010 (1st place award).

159. Bries A, Jacquet R, Lowder E, McBurney D, Landis WJ, Adamczyk MJ, Steiner R, Askew M, Horton Jr WE, Horne W, Morscher M, Weiner DS. A study in vivo of the effects of a static compressive load on the proximal tibial physis in rabbits. Orthopaedic Research Society, New Orleans, LA, February, 2010.

160. Matsushima S, Isogai N, Jacquet R, Lowder E, Tokui T, Landis WJ. The nature and role of periosteum in bone and cartilage regeneration. Tenth International Conference on the Chemistry and Biology of Mineralized Tissues, Scottsdale, AZ, November, 2010. Submitted for presentation.

161. Bries A, Weiner D, Jacquet R, Morscher M, Adamczyk M, Steiner R, Askew M, Horne W, Lowder E, Landis W. Effects of a static compressive load applied in vivo to the proximal tibial physis in rabbits. Tenth International Conference on the Chemistry and Biology of Mineralized Tissues, Scottsdale, AZ, November, 2010. Submitted for presentation.

162. Tank J, Weiner D, Jacquet R, Morscher M, Childs D, Ritzman T, Horne W, Lowder E, Landis W. Effects of hypothyroidism on the proximal femoral physis in miniature swine. Tenth International Conference on the Chemistry and Biology of Mineralized Tissues, Scottsdale, AZ, November, 2010. Submitted for presentation.

163. Tank J, Weiner D, Jacquet R, Morscher M, Childs D, Ritzman T, Horne W, Lowder E, Landis W. Effects of hypothyroidism on the proximal femoral physis in miniature swine. American Academic of Orthopaedic Surgery, Los Angeles, CA, February, 2011. Submitted for presentation.

164. Childs D, Jacquet R, Landis W, Tank J, Morscher M, Weiner D. Effects of hypothyroidism on gene expression in miniature swine. American Academic of Orthopaedic Surgery, Los Angeles, CA, February, 2011. Submitted for presentation.

Undergraduate Students in Laboratory, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio

2000	Anna Cruz (M2)
2000, 2001	Thomas Scharschmidt (M2, M3)
2001	Deepa Reddy (M2)
2002	Andrew Schoenfeld (M4)
2002	Adam Yanke (Miami University of Ohio)
2003	Kavitha Kotha (M2)
2003	Jovan Laskovski (M2)
2004	Alla Kukuyev (M1)
2004	Eric Liu (M1)
2007	Jimmy Laskovski (Miami University of Ohio)
2007	Jason Tank (M3)

2007 Halley Wasserman (M2)
2007, 2008 Dylan Childs (M2, M3)
2008 Ryan Hartman (M2)

Graduate Students in Laboratory, Northeastern Ohio Universities College of Medicine, Rootstown, Ohio

2001 Eric Katz (Kent State University)
2001 Jian Peng (Kent State University)
2002-2004 Ami Shah (University of Akron)
2005-2006 Rebecca Leidy Blice (University of Akron)
2005-2007 Robin Jacquet (Kent State University)
2006-2007 Alison Doherty (Kent State University)

Graduate Students in Laboratory, University of Akron
2010- Ling Chen (University of Akron)

Postdoctoral Students or Fellows Supervised

1982-1985 Duke Lee, Ph.D., Children's Hospital and Harvard Medical School
1988-1990 Marc McKee, Ph.D., Children's Hospital and Harvard Medical School
1999-2001 Shinichi Asamura, M.D., Kinki University School of Medicine, Osaka, Japan, and Northeastern Ohio Universities College of Medicine
2001-2003 Hirohisa Kusahara, M.D., Kinki University School of Medicine, Osaka, Japan, and Northeastern Ohio Universities College of Medicine
2003-2005 Mitsuhiro Enjo, M.D., Kinki University School of Medicine, Osaka, Japan, and Northeastern Ohio Universities College of Medicine
2004-2006 Yoshitaka Wada, M.D., Kinki University School of Medicine, Osaka, Japan, and Northeastern Ohio Universities College of Medicine
2004-2006 Thomas Scharschmidt, M.D., Northeastern Ohio Universities College of Medicine
2005-2007 Andrew Schoenfeld, M.D., Northeastern Ohio Universities College of Medicine
2005-2007 Tyson Schrickel, M.D., Northeastern Ohio Universities College of Medicine
2007-2008 Taku Tokui, M.D., Kinki University School of Medicine, Osaka, Japan, and Northeastern Ohio Universities Colleges of Medicine and Pharmacy
2008- Seika Matsushima, M.D., Kinki University School of Medicine, Osaka, Japan, and Northeastern Ohio Universities Colleges of Medicine and Pharmacy
2010- Jessica Kemppainen, Ph.D., University of Akron

Theses Supervised

David E. Altobelli, Ph.D. Thesis, "Biophysical properties of mineralized and demineralized rat bone powder preparations." Harvard School of Dental Medicine, Harvard University, Boston, MA, 1983.

Melissa Kacena, Ph.D. Thesis, "Studies of cultured bone cells under the influence of microgravity." Department of Astronautics and Aeronautics, University of Colorado, Boulder, CO, 1999.

Ami Shah, M.S. Thesis, "Bone regeneration mediated by a novel oxygen delivery system." Department of Biomedical Engineering, University of Akron, Akron, OH, 2004.

Robin DiFeo Jacquet, M.S. Thesis, "Gene expression and protein secretion in chondrogenesis utilizing an auricular-shaped scaffold model for tissue engineering." Department of Molecular and Cell Biology, Kent State University, Kent, OH, 2007.

Alison M. Doherty, M.S. Thesis, "Murine metapodophalangeal sesamoid bone mineralization: A light and electron microscopy study." Department of Molecular and Cell Biology, Kent State University, Kent, OH, 2007.

Thesis Committees

Andrew Jodaikin, Ph.D. Thesis, "The role of the organic matrix in enamel mineralization." Weizmann Institute of Technology, Rehovot, Israel, March, 1986

Gary R. Login, M. Med. Sc. Thesis, "Microwave energy fixation of tissue specimens for electron microscopy studies." Harvard School of Dental Medicine, Harvard University, Boston, MA, April,1986.

Hadi Sutedja, D. Med. Sc. Thesis, "Influence of the pathogenesis and progression of diabetes mellitus on osteocalcin and other parameters of bone metabolism." Harvard School of Dental Medicine, Harvard University, Boston, MA, October, 1988.

Gary R. Login, D. Med. Sc. Thesis, "A novel microwave device designed to preserve cell structure in milliseconds." Harvard School of Dental Medicine, Harvard University, Boston, MA, May, 1990.

Nancy P. Camacho, Ph.D. Thesis, "Applications of Fourier transform infrared microscopy to biomineralization." Department of Chemistry, Rutgers University, Newark, NJ, October, 1991.

Sergio J. Gadaleta, Ph.D. Thesis, "FTIR microspectroscopy studies of calcified tissues." Department of Chemistry, Rutgers University, Newark, NJ, September, 1995.

George Pins, Ph.D. Thesis, "The influence of stretching and decorin on the structural and mechanical properties of self-assembled collagen fibers." Department of Pathology, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, Rutgers University, Piscataway, NJ, May, 1996.

Weidong Tong, Ph.D. Thesis, "Synthesis of nanometer-sized apatites using highly ordered collagen structure." Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH, August, 2001.

Dana Duren, Ph.D. Thesis, "Physeal orientation, form, and function: Relationships with primate locomotor behavior." Department of Anatomy, Northeastern Ohio Universities College of Medicine, Rootstown, OH, December, 2001.

John Longsworth, Ph.D. Thesis, "Effect of collagen fibril mineralization and orientation on osteoclast resorption." Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH. Studies terminated, January, 2005.

Paul Zaslansky, Ph.D. Thesis, "The role of the organic matrix in enamel mineralization." Weizmann Institute of Technology, Rehovot, Israel, October, 2005.

Paul Curtin, Medical Doctorate (M.D.) Thesis, "The role of phosphorylation in determining the biological activity of bone sialoprotein and other studies in mouse calvarial organ culture." Department of Surgery, National University of Ireland, Cork, Ireland, May, 2006.

Zhilei Liu, M.S. Thesis, "Morphological modeling of the size and shape of bone mineralites imaged by atomic force microscopy." Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH, July, 2006.

Gurpreet Singh Baht, Ph.D. Thesis, "Effect of collagen-binding and phosphorylation in BSP-mediated hydroxyapatite nucleation," Department of Biochemistry, University of Western Ontario, London, Ontario, Canada, August 24, 2009.

Ashleigh Nugent, Ph.D. Thesis, "The role of Bcl-2 associated athanogene-1 (Bag-1) in chondrocyte endoplasmic reticulum stress using a model of *ex vivo* generated cartilage." Department of Molecular and Cell Biology, Kent State University, Kent, OH, September, 2010.

Outreach Presentations on Tissue Engineering

STEM Program. Girard High School, Girard, OH. February 18, 2010.

Med-Camp Program, Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Rootstown, OH. July 15, 2010.