

CURRICULUM VITAE

Elise Feng-i Morgan

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Education and Training

2002-03 Postdoctoral Researcher, Department of Mechanical Engineering, Stanford University
2002 Ph.D., Mechanical Engineering, University of California, Berkeley
2000 M.S., Mechanical Engineering, University of California, Berkeley
1996 B.S., Mechanical Engineering, Stanford University

Positions

2009- Associate Professor, Dept. of Mechanical Engineering, Boston University
2008-09 Assistant Professor, Dept. of Mechanical Engineering, Boston University
2004- Assistant Professor, Dept. of Biomedical Engineering, Boston University
2003- Adjunct Assistant Professor, Dept. of Orthopaedic Surgery, Boston University School of Medicine
2003- Assistant Professor, Dept. of Aerospace & Mechanical Engineering, Boston University
1999-02 Engineering Consultant, Supracor, Inc., San Jose, California
1996-97 Mathematics Teacher, The Pingry School, Martinsville, New Jersey

Honors

2009 Early Career Research Excellence Award, College of Engineering, Boston University
2005 Young Investigator Research Award, International Osteoporosis Foundation and Servier Research Group
2000 Outstanding Graduate Student Instructor Award, University of California, Berkeley
1999 First Place, American Society of Mechanical Engineers Master's Paper Competition
1997-00 National Science Foundation Graduate Research Fellowship
1996 Phi Beta Kappa Honors Society
1996 Tau Beta Pi Engineering Honors Society
1995 Lincoln Arc Welding Foundation Award
1995 Stanford Summer Undergraduate Research Fellowship
1993 President's Award, Stanford University

Publications and Presentations

Peer-Reviewed Journal Articles

Morgan, EF, Salisbury Palomares, KT, Gleason, RE, Bellin, DL, Chien, KB. Correlations between local strains and tissue phenotypes in an experimental model of skeletal healing. In review, *Journal of Biomechanics*
Salisbury Palomares, KT, Gerstenfeld, LC, Wigner, NA, Lenburg, ME, Einhorn, TA, Morgan, EF. Transcriptional profiling and biochemical analysis of mechanically induced cartilaginous tissues. In press, *Arthritis and Rheumatism*.
Leong, PL and Morgan, EF. Correlations between indentation modulus and mineral density in bone-fracture calluses. *Integrative and Comparative Biology*, 2009; 49: 59-68.

- Cuomo AV, Virk M, Petrigliano F, Morgan EF, Lieberman JR. Mesenchymal stem cell concentration and bone repair: potential pitfalls from bench to bedside. *Journal of Bone and Joint Surgery* 2009; 91A(5): 1073-83.
- Bais MV, Wigner N, Young M, Toholka R, Graves DT, Morgan EF, Gerstenfeld LC, Einhorn TA. BMP2 is essential for post natal osteogenesis but not for recruitment of osteogenic stem cells. *Bone*, 2009; 45(2): 254-66.
- Kim HK, Bian H, Aya-ay J, Garces A, Morgan EF, Gilbert SR. Hypoxia and HIF-1alpha expression in the epiphyseal cartilage following ischemic injury to the immature femoral head. *Bone*, 2009; 45(2): 280-8.
- Gaur, T, Wixted, JJ, Hussain, S, O'Connel, S, Morgan, EF, Ayers, D, Komm, BS, Bodine, PV, Stein, GS, Lian, JB. Secreted frizzled related protein 1 is a target to improve fracture healing. *Journal of Cellular Physiology*, 2009; 220(1): 174-181.
- Hunter, DJ, Gerstenfeld, LC, Bishop, G, Mason, ZD, Einhorn, TA, Maciewicz, RA, Newham, P, Morgan, EF. Bone marrow lesions from osteoarthritic knees are characterized by sclerotic bone that is less well mineralized. *Arthritis Research*, 2009; 11(1): R11.
- Salisbury Palomares, KT, Gleason, RE, Mason, ZD, Cullinane, DM, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. Mechanical stimulation alters tissue differentiation and molecular expression during bone healing. *Journal of Orthopaedic Research*, 2009; Feb 25 [Epub ahead of print].
- Hayward, LNM and Morgan, EF. Assessment of a mechano-regulation theory of skeletal tissue differentiation in an *in vivo* model of mechanically induced cartilage formation. *Biomechanics and Modeling in Mechanobiology*, 2009; Jan 21 [Epub ahead of print].
- Gerstenfeld, LC, Sacks, DJ, Pelis, M, Mason, ZD, Graves, DT, Barrero, M, Ominsky, M, Kostenuik, PJ, Morgan, EF, Einhorn, TA. Comparison of bisphosphonate alendronate versus the RANKL inhibitor denosumab on murine fracture healing. *Journal of Bone and Mineral Research*, 2009; 24(2): 196-208.
- Morgan, EF, Chien, KB, Mason, ZD, Pfeiffer, AJ, Barnes, GL, Einhorn, TA, Gerstenfeld, LC. Micro-computed tomography assessment of fracture healing: relationships among callus structure, composition, and mechanical function. *Bone* 2009; 44(2): 225-44.
- Morgan, EF, Mason, ZD, Bishop, G, Davis, AD, Gerstenfeld, LC, Einhorn, TA. Combined effects of recombinant human BMP-7 (rhBMP-7) and parathyroid hormone (1-34) in metaphyseal bone healing. *Bone* 2008; 43(6):1031-8.
- Leong PL and Morgan, EF. Measurement of fracture callus material properties via nanoindentation. *Acta Biomaterialia*, 2008; 4(5):1569-1575.
- Kaufman, JD, Miller, GE, Morgan, EF, Klapperich, CM. Time-dependent mechanical characterization of poly(2-hydroxyethyl methacrylate) hydrogels using nanoindentation and confined compression. *Journal of Materials Research*, 2008; 23(5):1472-1481.
- Jacobsen, KA, Alaql, ZS, Fitch, J, Mason, ZD, Cole, RM, Gilbert, SR, Clemens, TL, Morgan, EF, Einhorn, TA, Gerstenfeld, LC. Bone formation during distraction osteogenesis is dependent on both VEGFR1 and VEGFR2 signaling. *Journal of Bone and Mineral Research*, 2008; 23(5); 596-609.
- Morgan, EF, Gleason, RE, Leong, PL, Hayward, LN, Salisbury Palomares, KT. Mechanotransduction and fracture repair. *Journal of Bone and Joint Surgery*, 2008; 90(2):S25-90.
- Houtchens, GR, Foster, MD, Desai, TA, Morgan, EF, Wong, JY. Combined effects of microtopography and cyclic strain on vascular smooth muscle cell orientation. *Journal of Biomechanics*, 2008; 41(4): 762-9.
- Kakar, S, Einhorn, TA, Vora, S, Miara, LJ, Hohn, G, Tobin, D, Jacobsen, KA, Al-Sebaei, MO, Song, M, Trackman, P, Morgan, EF, Gerstenfeld, LC, Barnes, GL. Enhanced chondrogenesis and wnt-

- signaling in parathyroid hormone treated fractures. *Journal of Bone and Mineral Research*, 2007; 22(12):1903-12.
- Liu, L and Morgan, EF. Accuracy and precision of digital volume correlation in quantifying displacements and strains in trabecular bone. *Journal of Biomechanics*, 2007; 40(15):3516-20.
- Tsiridis E, Morgan EF, Bancroft JM, Song M, Kain M, Gerstenfeld LC, Einhorn TA, Bouxsein ML, Tornetta P 3rd. Effects of OP-1 and PTH in a new experimental model for the study of metaphyseal bone healing. *Journal of Orthopaedic Research*, 2007; 25(9): 1193-203.
- Kayal RA, Tsatsas D, Bauer MA, Allen B, Al-Sebaei MO, Kakar S, Leone CW, Morgan EF, Gerstenfeld L, Einhorn TA, Graves DT. Diminished bone formation during diabetic fracture healing is related to the premature resorption of cartilage associated with increased osteoclast activity. *Journal of Bone and Mineral Research*, 2007; 22(4): 560-8.
- Morgan, EF, Longaker, MT, Carter, DR. Relationships between tissue dilatation and differentiation in distraction osteogenesis. *Matrix Biology*, 2006; 25(2): 94-103.
- Morgan, EF, Yeh, OC, Keaveny, TM. Damage in trabecular bone at small strains. *European Journal of Morphology*, 2005; 42(1-2): 13-21.
- Morgan, EF, Lee, JJ, and Keaveny, TM. Sensitivity of multiple damage parameters to compressive overload in cortical bone. *Journal of Biomechanical Engineering*, 2005; 127(4): 557-562.
- Li, S and Morgan, EF. Effective elastic moduli of two dimensional solids with distributed cohesive microcracks. *European Journal of Mechanics A/Solids*, 2004; 23(6): 925-933.
- Morgan, EF, Bayraktar, HH, Yeh, OC, Majumdar, S, Burghardt, A, and Keaveny, TM. Contribution of inter-site variations in architecture to trabecular bone apparent yield strain. *Journal of Biomechanics*, 2004; 37(9): 1413-1420.
- Salim, A, Nacamuli, RP, Morgan, EF, Giaccia, AJ, Longaker, MT. Transient changes in oxygen tension inhibit osteogenic differentiation and runx2 expression in osteoblasts. *J Biological Chemistry* 2004; 279(38):40007-40016.
- Khurana, RN, Baudendistel, TE, Morgan, EF, Rabkin, RA, Elkin, RB, and Aalami, OO. Postoperative rhabdomyolysis following laparoscopic gastric bypass in the morbidly obese. *Archives of Surgery*, 2004; 139(1): 73-76.
- Bayraktar, HH, Morgan, EF, Morris, GM, Wong, EK, and Keaveny, TM. Comparison of the elastic and yield properties of human femoral trabecular and cortical bone tissue. *Journal of Biomechanics*, 2004; 37(1): 27-35.
- Li, S and Morgan, EF. Micromechanics modeling of plastic yielding in a solid containing mode III cohesive cracks. *International Journal of Fracture*, 2003; 120(1-2): L105-L112.
- Morgan, EF, Bayraktar, HH, and Keaveny, TM. Trabecular bone modulus-density relationships depend on anatomic site. *Journal of Biomechanics* 2003; 36(7): 897-904.
- Kopperdahl, DL, Morgan, EF, Keaveny, TM. Quantitative computed tomography estimates of the mechanical properties of human vertebral bone. *Journal of Orthopaedic Research*, 2002; 20(4): 801-5.
- Morgan, EF and Keaveny, TM. Dependence of yield strain of human trabecular bone on anatomic site. *Journal of Biomechanics*, 2001; 34(5): 569-577.
- Morgan, EF, Yeh, OC, Chang, WC, Keaveny, TM. Nonlinear behavior of trabecular bone at small strains. *Journal of Biomechanical Engineering*, 2001; 123(1): 1-9.
- Morgan, EF, Yetkinler, DN, Constantz, BR, Dauskardt, RH. Mechanical properties of a carbonated hydroxyapatite bone mineral substitute. *Journal of Materials Science: Materials in Medicine*, 1997; 8(9): 559-570.

Book Chapters and Review Articles

- Morgan, EF and Einhorn, TA. Biomechanics of Fracture Healing. In: Rosen, CJ, editor. *Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism*, 7th edition. In press.

- Morgan, EF and Bouxsein, ML. Biomechanics of Bone and Age-Related Fractures. In: Bilezikian, JP, Raisz, LG, Martin, J, editors. *Principles of Bone Biology*, 3rd edition. Boston: Elsevier Academic Press; 2008; pp. 29-51.
- Barnes, GL, Kakar, S, Vora, S, Morgan, EF, Gerstenfeld, LC, Einhorn, TA. Stimulation of fracture healing with systemic intermittent parathyroid hormone treatment. *Journal of Bone and Joint Surgery*, 2008; 90(Suppl 1): 120-7.
- Morgan, EF, Barnes, GL, Einhorn, TA. The Bone Organ System: Form and Function. In: Marcus, R, Feldman, D, Nelson, D, Rosen, CJ, editors. *Osteoporosis*, 3rd edition. Boston: Elsevier Academic Press; 2008; pp. 3-25.
- Morgan, EF and Bouxsein, ML. Use of Finite Element Analysis to Assess Bone Strength. *BoneKey-Osteovision Perspectives*, 2005; 2(12): 8-19 (<http://www.bonekey-ibms.org/cgi/content/full/ibmske>)
- Keaveny, TM, Morgan, EF, Yeh, OC. Bone Mechanics. In: Kurtz, M, editor. *Standard Handbook of Biomedical Engineering and Design*, McGraw Hill, New York, 2003, pp 8.1-8.23.
- Keaveny, TM, Morgan, EF, Niebur, GL, Yeh, OC. Biomechanics of Trabecular Bone. *Annual Reviews in Biomedical Engineering*, Vol 3: 307-333, 2001.

Thesis

Morgan, EF. The dependence of structure-function relationships for human trabecular bone on anatomic site. University of California, Berkeley, 2002.

Selected Conference Presentations

- Bian, H, Aya-ay, J, Garces, A, Morgan, EF, Gilbert, SR, Kim, H.K. Epiphyseal cartilage plays an important role in revascularization of the femoral head following ischemic osteonecrosis. 2009 Annual Meeting of the Pediatric Orthopaedic Society of North America. *Vernon T. Tolo Basic Science Paper Award*
- Hussein, AI, Mason, ZD, Morgan, EF. The effect of intra-vertebral heterogeneity in structure on vertebral strength and failure patterns. 55th Annual Meeting of the Orthopaedic Research Society, 2009.
- Morgan, EF, Baker, AH, Mason, ZD, Hussein, AI. Quantitative image-guided failure analysis of the human vertebra. 55th Annual Meeting of the Orthopaedic Research Society, 2009.
- Altman, K, Flores, K, Farson, D, and Morgan, EF. Femtosecond laser micromachining of bone mechanical test specimens. The Minerals, Metals, and Materials Society Annual Meeting and Exhibition, San Francisco, 2009.
- Morgan, EF, Baker, AH, Mason, ZD, Hussein, AI. Quantitative, three-dimensional visualization of vertebral fractures. World Congress on Osteoporosis, Bangkok, Thailand, 2008.
- Salisbury Palomares, KT, Gleason, RE, Bellin, D, Miller, GJ, and Morgan, EF. Correlations between local strains and tissue phenotypes in an experimental model of skeletal healing. Gordon Research Conference on Musculoskeletal Biology and Bioengineering, Andover, NH, 2008.
- Miller, GJ and Morgan, EF. Use of nanoindentation to determine viscoelastic and biphasic material properties of hydrogels and articular cartilage. ASME International Mechanical Engineering Congress and Exhibition (IMECE), Boston, MA, 2008.
- Mason, ZD, Barbone, PE, Morgan, EF. Experimental measurement of 3-D deformation and failure patterns in the vertebra using digital volume correlation. ASME International Mechanical Engineering Congress and Exhibition (IMECE), Boston, MA, 2008.
- Hussein, AI, Mason, ZD, Morgan, EF. Predictions of vertebral strength from quantitative measures of the intra-vertebral heterogeneity in density. ASME Summer Bioengineering Conference, 2008.

- Leong, PL and Morgan, EF. Correlation between nanoindentation modulus and mineral density in fracture callus tissues. ASME Summer Bioengineering Conference, 2008. *Honorable Mention, M.S.-level Student Poster Competition, Solid Mechanics Category*
- Hayward, LNM and Morgan, EF. Mechano-regulation of stem cell differentiation during bending stimulation of a healing bone defect. ASME Summer Bioengineering Conference, 2008.
- Leong, PL and Morgan, EF. Regional variations in fracture callus material properties measured via nanoindentation. Paper #1009, 54th Annual Meeting of the Orthopaedic Research Society, 2008.
- Salisbury Palomares, KT, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. Transcriptional profiling of mechanically induced cartilaginous tissues *in vivo*. Paper #611, 54th Annual Meeting of the Orthopaedic Research Society, 2008.
- Salisbury Palomares, KT, Miller, GE, Morgan, EF. Experimental measurement of strains in callus tissues: correlations with mechanically induced tissue phenotypes during skeletal repair. Paper #1008, 54th Annual Meeting of the Orthopaedic Research Society, 2008.
- Gerstenfeld, LC, Sacks, D, Pelis, M, Mason, ZD, Morgan, EF, Einhorn, TA. Comparison of alendronate versus denosumab (a monoclonal anti-RANKL antibody) on murine fracture healing. Paper #890, 54th Annual Meeting of the Orthopaedic Research Society, 2008.
- Morgan, EF, Mason, ZD, Bishop, G, Davis, AD, Gerstenfeld, LC, Einhorn, TA. Combined effects of BMP-7 and PTH in metaphyseal bone healing. Paper #399, 54th Annual Meeting of the Orthopaedic Research Society, 2008.
- Barnes, GL, Kakar, S, Vora, S, Record, N, Wigner, NA, Morgan, EF, Gerstenfeld, LC, Einhorn, TA. Enhanced chondrogenic maturation in PTH treated fractures. Paper #167, 54th Annual Meeting of the Orthopaedic Research Society, 2008.
- Alsofi L, Xu, J, Mason, ZD, Morgan, EF, Deguchi, Y, Yamauchi, M, Trackman, PC. Trabecular bone phenotype in lysyl oxidase isoform knockout mice. 37th Annual Meeting of the American Association for Dental Research, 2008.
- Hunter, DJ, Morgan, EF, Gerstenfeld, LC, Bishop, G, Einhorn, TA, Maciewicz, RA, Newham, P. Bone marrow lesions from osteoarthritis knees are characterized by sclerotic bone that is less well mineralized. World Congress of Osteoarthritis, 2007.
- Morgan, EF, Oberai, AA, Barbone, PE, Nazarian, A. Anisotropic elasticity imaging with application to elasticity imaging of bone. International Conference on the Ultrasonic Measurement and Imaging of Tissue Elasticity, 2007.
- Gleason, RE, Palomares, KTS, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. A 3D Histomorphometric method for analyses of skeletal tissue mechanobiology. ASME Summer Bioengineering Conference, 2007.
- Palomares, KTS, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. Hyaline characteristics of mechanically induced cartilaginous tissues. ASME Summer Bioengineering Conference, 2007.
- Palomares, KTS, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. A novel experimental technique for quantifying the local mechanical environment of skeletal tissues. ASME Summer Bioengineering Conference, 2007.
- Chien, K, Mason, ZD, Al Sebaei, M, Barnes, GL, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. Multivariate assessment of fracture healing via micro-computed tomography. Paper #940, 53rd Annual Meeting of the Orthopaedic Research Society, 2007.
- Al-Sebaei, MO, Kakar, S, Mason, ZD, Silkman, L, Einhorn, TA, Morgan, EF, Gerstenfeld, LC. Experimental fracture healing in FAS mutant mice (B6.MRL/FAS^{LPR}). Paper #356, 53rd Annual Meeting of the Orthopaedic Research Society, 2007.
- Jacobsen, KA, Alaql, ZS, Cole, RM, Mason, ZD, Morgan, EF, Wan, C, Gilbert, SR, Clemens, TL, Einhorn, TA, Gerstenfeld, LC. Bone formation during distraction osteogenesis is dependent upon

- both VEGFR1 and VEGFR2 signaling. Paper #180, 53rd Annual Meeting of the Orthopaedic Research Society, 2007.
- Hadi, N, Price, C, Nasser, P, Morgan, EF, Einhorn, TA, Gerstenfeld, LC, Jepsen, KJ. Genetic variation in the regain of bone strength during fracture healing. Paper #225, 53rd Annual Meeting of the Orthopaedic Research Society, 2007.
- Cuomo, AV, Virk, M, Petrigliano, F, Morgan, EF, Lieberman, JR. Mesenchymal stem cell concentration and bone repair: potential pitfalls from bench to bedside. Paper #450, 53rd Annual Meeting of the Orthopaedic Research Society, 2007.
- Fitch, JL, Palomares, KTS, Behnam, K, Knaack, D, Morgan, EF, Einhorn, TA, Gerstenfeld, LC. Comparison of DBM and BMP2 activities *in vitro* via microarray analysis demonstrates that DBM induces both angiogenesis and skeletogenesis. Annual Meeting of the American Society of Bone and Mineral Research, 2006.
- Kayal, R, Tsatsas, D, Bauer, M, Krall, E, Morgan, EF, Gerstenfeld, LC, Graves, DT. Diabetes may improve fracture healing by excess removal of cartilage. Annual Meeting of the American Society of Bone and Mineral Research, 2006.
- Barnes, GL, Kakar, S, Jacobsen, KA, Miara, L, Morgan, EF, Gerstenfeld, LC, Einhorn, TA. Parathyroid hormone enhances osteochondroprogenitor proliferation and differentiation during fracture repair through a Wnt signaling mediated mechanism. Annual Meeting of the American Society of Bone and Mineral Research, 2006.
- Richards, M, Gohkale, N, Liu, L, Morgan, EF, Oberai, AA, Barbone, PE. A method for noninvasive measurement of tissue biomechanical properties. Biomedical Engineering Society Annual Meeting, 2006.
- Liu, L and Morgan, EF. The accuracy and precision of digital image correlation in quantifying local 3-D strains in trabecular bone depend on trabecular architecture. Fifth World Congress of Biomechanics – joint European Society of Biomechanics track, 2006.
- Liu, L and Morgan, EF. Accuracy and precision of digital image correlation in quantifying local 3-D displacements and strains in trabecular bone. ASME Summer Bioengineering Conference, 2006.
- Salisbury, KT, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. Mechanobiological regulation of Molecular Expression and Tissue Phenotype. Annual Meeting of the American Society of Bone and Mineral Research, 2005.
- Salisbury, KT, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. Mechanobiological regulation of molecular expression and tissue differentiation during bone healing. ASME Summer Bioengineering Conference, 2005. *First place, Masters Level Student Paper Competition, Cell and Tissue Engineering category*
- Salisbury, KT, Einhorn, TA, Gerstenfeld, LC, Morgan, EF. Mechanobiological regulation of cell molecular expression and tissue differentiation in bone healing. Transactions of the 51st meeting of the Orthopaedic Research Society, 2005.
- Fredericks, EE, Waite, RA, Salisbury, KT, Gerstenfeld, LC, Morgan, EF. Development of a technique to characterize the mechanical properties of articular cartilage in small animal models. Biomedical Engineering Society Annual Meeting, 2004.
- Morgan, EF, Yeh, OC, Keaveny, TM. Hierarchical investigation of damage in trabecular bone at small strains. Biomedical Engineering Society Annual Meeting, 2004.
- Morgan, EF, Yeh, OC, Keaveny, TM. Damage in trabecular bone at small strains. European Society of Biomechanics Annual Meeting, Den Bosch, The Netherlands, 2004.
- Morgan, EF, Longaker, MT, Carter, DR. Spatiotemporal patterns of regenerating tissue mechanobiology in distraction osteogenesis. Transactions of the 50th meeting of the Orthopaedic Research Society, 2004.

- Morgan EF, Lee JJ., Keaveny TM. Damage in cortical bone in response to a compressive overload. Society for Experimental Mechanics Technical Meeting on the Mechanics of Biological and Biologically Inspired Materials and Systems, Springfield, Massachusetts, 2003.
- Morgan EF, Lobo EG, Fang TD, Longaker MT, Carter DR. Temporal variations in mechanical stimuli during mandibular distraction osteogenesis. 10th International Congress of the International Society of Craniofacial Surgery, Monterey, California, 2003.
- Morgan EF, Bayraktar, HH, Yeh, OC, Keaveny, TM. Contribution of inter-site differences in architecture to trabecular bone yield behavior. Transactions of 48th meeting of the Orthopaedic Research Society, p. 90, 2002.
- Bayraktar, HH, Niebur, GL, Morgan, EF, Keaveny, TM. Elastic and failure properties of trabecular tissue at the human femoral neck. ASME Summer Bioengineering Conference, Salt Lake City, Utah, 2001.
- Morgan, EF, Yeh, OC, Keaveny, TM. Nonlinear behavior of trabecular bone at small strains. Transactions of 46th meeting of the Orthopaedic Research Society, p. 31, 2000.
- Morgan, EF, Arramon, YP, Kopperdahl, DL, Keaveny, TM. Dependence of yield strain on anatomic site for human trabecular bone. ASME IMECE, BED Vol 43: 23-24, 1999. *First place, Bioengineering Division Master's Level Student Paper Competition*
- Arramon, YP, Yeh, OC, Morgan, EF, Keaveny, TM. Axial-shear failure behavior of human femoral trabecular bone. ASME IMECE, BED Vol 43: 173-174, 1999.
- Keaveny, TM, Yeh, OC, Morgan, EF, Chang, WC, Haddock SM. Non-linear elastic behavior of trabecular bone. Third World Congress of Biomechanics, Sapporo, Japan, p. 260, 1998.

Invited Technical Seminars and Lectures

- Department Seminar, Bioengineering, University of Utah, February, 2009.
- Invited Talk, Symposium on “*Biomaterials: properties, variation and evolution*”, Annual Meeting of the Society for Integrative and Comparative Biology, Boston, January, 2009.
- Invited Talk, World Congress on Osteoporosis, Bangkok, Thailand, December, 2008.
- Department Seminar, Bioengineering, University of Pennsylvania, November, 2008.
- Department Seminar, Bioengineering, University of Maryland, October, 2008.
- Invited Lecture, Orthopaedic Trauma Association Basic Science Fracture Forum, Denver, CO, October, 2008.
- Department Seminar, Materials Science and Engineering, Massachusetts Institute of Technology, February 2008.
- Department Seminar, Mechanical and Aerospace Engineering, Cornell University, February 2008.
- Department Seminar, Biomedical Engineering, Columbia University, February 2008.
- Department Colloquium, Departments of Orthopaedic Surgery and Cell Biology, University of Massachusetts Medical School, October 2007.
- Seminar, Center for Biomolecular and Tissue Engineering, Duke University, October 2007.
- Department Seminar, Mechanical and Aerospace Engineering, Case Western Reserve University, September 2007.
- Invited Lecture, American Academy of Orthopaedic Surgeons (AAOS) Research Symposium, Fracture Repair: Challenges and Opportunities, Miami Beach, FL, April, 2007.
- Invited Lecture, Ortooreuma 2005: International Conference on Bone and Joint Aging, Milan, Italy, September 2005.
- Department Colloquium, Department of Orthopaedic Surgery, Brown University, February, 2005.
- Department Seminar, Department of Mechanical Engineering, Northeastern University, January, 2005.
- Department Seminar, Department of Aerospace & Mechanical Engineering, University of Notre Dame, October, 2004.

Orthopedic Biomechanics Laboratory Seminar, Department of Orthopedic Surgery, Harvard University, June, 2004.

Department Seminar, Department of Mechanical Engineering, University of Rhode Island, April, 2004.

Professional Societies and Service

American Society of Mechanical Engineers	Member
<i>Theme Leader (Theme: Hard Tissue and Joints) for the 2008 and 2009 ASME Summer Bioengineering Conferences</i>	
Orthopaedic Research Society	Member
American Society of Bone and Mineral Research	Member
Osteoarthritis Research Society International	Member
American Society of Engineering Education	Member
Journal of Biomechanics, Bone, Journal of Biomechanical Engineering, Experimental Mechanics, Annals of Biomedical Engineering, Journal of Orthopaedic Research, Journal of Biomedical Materials Research, Biomechanics and Modeling in Mechanobiology, Osteoporosis International, Journal of Bone and Joint Surgery, Materials Research Communications, European Journal of Morphology, Chaos, Journal of Dental Research	Ad Hoc Reviewer
2009	Review Panel, NSF-CMMI
2007	Special Emphasis Review Panel, “Enabling Technologies for Tissue Engineering and Regenerative Medicine”, NIH-NHLBI
2006	Review Panel, NSF-CMS
2006	14 th Annual Symposium of Computational Methods in Orthopaedic Biomechanics, Moderator
2006	Review Panel, NSF-BES/RAPD
2005	Special Emphasis Review Panel, Shared Instrumentation Grant Program (Imaging), NIH-NCRR
2004	US-Israel Binational Science Foundation
2004	Scottish Hospital Endowment Research Trust
2003	12 th Annual Symposium of Computational Methods in Orthopaedic Biomechanics, Moderator

Extramural Research Funding

Active

2008-11	NSF/CMMI, PI, “Collaborative Research: Micro- and Nano-Scale Characterization and Modeling of Bone Tissue”, \$67,940 (total costs)
2008-13	NIH R01, PI, “3-D Visualization and Prediction of Spine Fractures”, \$1,607,356 (total costs)
2007-09	Shriners Hospitals for Children (prime), subcontract PI, “Prevention of Femoral Head Deformation following Ischemic Osteonecrosis”, \$22,748 (total costs)
2005-09	NIH R01, PI, “Inducing Skeletal Repair by Mechanical Stimulation”, \$1,156,200 (total costs)

2004-09 NIH P01, Core Co-Investigator, “Molecular Mechanisms of Skeletal Repair” (PI: TA Einhorn), \$5,529,749 (total costs)

Completed

2007-08 Zelos, Co-Investigator, “Comparison of Ostabolin-C to Parathyroid Hormone (1-34) in the Enhancement of Experimental Fracture Healing”, (PI: TA Einhorn), \$118,290 (total costs)

2007 Harvest, Co-Investigator, “Therapeutic Potential of Human Marrow Stromal Cells to Enhance Critical Size Defect Healing”, (PI: TA Einhorn), \$88,213 (total costs)

2006-07 Amgen, Co-Investigator, “Comparison of Two Anti-Resorptive Therapies (Alendronate versus AMG 162 Monoclonal Anti-RANKL Antibody) on Murine Fracture Healing”, (PI: TA Einhorn), \$36,722 (total costs)

2006-08 International Osteoporosis Foundation, PI, “3-D Visualization and Prediction of Spine Fractures”, €40,000 (total costs)

2005-07 NSF-BES, PI, “Acquisition of a High-Resolution Micro-Computed Tomography System with Large Sample Capacity”, \$269,000 (total costs)

2006-07 GlaxoSmithKline, Co-Investigator, “Comparison of SB 768974 and SB 751689 to Parathyroid Hormone (1-34) in the Enhancement of Experimental Fracture Healing”, (PI: TA Einhorn), \$162,407 (total costs)

2006 Stryker Pharmaceuticals, Co-Investigator, “Synergism between OP-1 and PTH in a Rabbit Model of Tibial Healing” (PI: TA Einhorn), \$170,104 (total costs)

2005-06 NIH-NCRR, PI, “High-Resolution Desktop Micro-Computed Tomography System”, \$210,000 (total costs)

2005-06 BioSET, Inc., Co-Investigator, “Therapeutic Potential of B2A2 in Enhancement of Normal Fracture Repair” (PI: TA Einhorn), \$17,551 (total costs)

2004-05 Stryker Pharmaceuticals, Co-Investigator, “Pilot Study to Assess Synergism between PTH and BMP-7 in a Rabbit Model of Tibial Healing” (PI: TA Einhorn), \$27,242 (total costs)

2004-05 Biomimetics, Inc., Co-Investigator, “Enhancement of Experimental Fracture Healing with PDGF” (PI: TA Einhorn), \$55,011 (total costs)

Other Funding

2009-10 Dean’s Catalyst Award, “Shock Wave Therapy for Treating Non-Union Bone Fracture”, \$29,434 (total costs)

2004 Boston University Office of the Provost, Special Program for Research Initiation Grants (SPRInG), PI, “Mechanobiology of Osteoblast-Endothelial Cell Interactions”, \$25,000 (total costs)

Courses Taught

Undergraduate

EK301, “Engineering Mechanics I”: Fall 2003, Spring 2004, Spring 2005, Fall 2005

ME305, “Mechanics of Materials”: Fall 2007, Fall 2008

Graduate

ME524, “Skeletal Tissue Mechanics”: Fall 2004, Fall 2006, Fall 2009

ME582, “Advanced Mechanical Behavior of Materials”: Spring 2007

Synergistic Activities

2007-	Organizer, Summer Pathways, Boston University
2006-	PROSTARS Residency Program Committee
2006-07	Faculty Participant, Learning Experiences for New Scientists, Boston University
2003-	Lecturer, Orthopaedic Surgical Residents' Basic Science Lecture Series, Boston University School of Medicine
2005	Faculty Participant, AME Day, Boston University
2005	Faculty Participant, AME Science Day, Boston University
2005	Judge, Science and Engineering Day, Boston University
2004	Judge, Peak Performance Engineering Design Competition, Boston University

Advisees and Staff*Primary Advisor – Graduate Level (4 Ph.D. and 1 M.S. students currently)*

2010 (anticipated)	John Gallagher	M.S., ME
2009 (anticipated)	Amira Hussein	Ph.D. prospectus, ME Boston University
2009 (anticipated)	Greg Miller	Ph.D. prospectus, ME Boston University
2008	Pui Leong	Ph.D. prospectus, BME Boston University
2008	Lauren Hayward	Ph.D. prospectus, BME Boston University
2007	Kristy Salisbury Palomares “Mechanobiological Regulation of Cell and Molecular Expression during Tissue Differentiation in Bone Healing” <i>Current position: MD/PhD program, Boston University</i>	Ph.D. in BME Boston University
2006	Nicholas Pratt <i>Current position: Analytical Engineer II, Vermont Composites</i>	M.S. in AME Boston University
2005	Li Liu “Measurement of In Situ Strains in Trabecular Bone” <i>Current position: Dosimetrist, Mass. General Hospital</i>	Ph.D. prospectus, AME Boston University

Primary Advisor – Undergraduate Level

	Name	Supporting Program	Current Position
2009	David Berry		Freshman, BMD
2009	Megan Sperry		Freshman, BME
2007-	Daniel Bellin	NSF-REU, UROP	Senior, BME
2007-08	Anthony Pfeiffer	Senior Project	M.D. program, Univ. Pittsburgh
2007	Mohit Butaney		Senior, BME
2007-	Alexina Fredman	UROP	Junior, BME
2006-	Karen Chien	UROP	Senior, BME
2006-07	Andrew Baker	NSF-REU, Senior Project	Test Engineer, DFine, Inc.
2006-08	Ryan Gleason	Industrial Research Fellowship, Senior Project	Engineering Technician, Atrium Medical
2005	Jennifer Treese		
2004-06	Jared Bancroft	UROP, NSF-REU, Senior	Laboratory Coordinator, BME

		Project	
2004-05	Akihiro Hidaka	Senior Project	
2004	Erin Fredericks	NSF-REU	
2004	Ryan Waite	NSF-REU	Ph.D. program, Georgia Tech
2003-04	Shannon Rowell	Senior Project	Research Technologist, Harris Orthopaedic Biomechanics and Biomaterials Lab, MGH
2003-04	David Litvak	Senior Project	

Supervisor – Staff

2005-2008 Zachary Mason, Research Technician

*Current Position: Engineering Coordinator, Human Engineering Research Laboratory, University of Pittsburgh**Committee Member – Graduate Level*

2009	Holly Brideau “The Inter-Relationship between MR Diffusion Measures and the Mechanical Status of the Intervertebral Disc”	M.S.	ME Boston University
2008	Alvin Khan “Cetacean Hearing and the Impact of Naval Sonar”	Ph.D.	BME Boston University
2008	Nate Wigner “Transcriptional Regulation of Aggrecan: Mechanisms of Chondrocyte Differentiation”	Ph.D.	Biochemistry Boston University
2008	Jessica Kaufman “Mechanical Characterization of Stiffness Gradient Hydrogel Substrates for Tissue Engineering”	Ph.D.	BME Boston University
2009	Andy Golden “Fabrication of Functional Blood Vessel Networks”	Ph.D.	BME Boston University
2009	Carlos Rivas “Analysis of Finite Element Formulations for Solving Inverse Problems Treated as Optimization Problems”	Ph.D.	AME Boston University
2007	Eben Tessari “Gradient Microenvironments for Neural Regenerative Materials”	M.S.	BME Boston University
2007	Kristen La Flamme “Nanoporous Alumina Interfaces for Cellular Encapsulation and Controlled Drug Delivery”	Ph.D.	BME Boston University
2007	Erica Thrall “Predicting Strength in the Human Proximal Femur”	M.S.	BME Boston University
2006	Nachiket Gokhalen “Inverse Problems in Non-Linear Elasticity Imaging”	Ph.D.	AME Boston University
2009	Harikrishnan Parameswaran “Relating Microscopic and Macroscopic Indices of Alveolar Structure: Applications for Emphysema”	Ph.D.	BME Boston University
2006	Haibiao Luo “Three-dimensional Model of Elastic Wave Propagation in Kidney Stones with Application to Shock Wave Lithotripsy”	Ph.D. prospectus	AME Boston University
2006	Oluwaseyi Balogun	Ph.D.	AME

	“Materials Characterization using Frequency Domain Photoacoustic Microscopy”		Boston University
2006	Elissa Beekman “Fabrication And Evaluation Of Nanostructured Titania For Osteoblast Cell Culture”	M.S.	BME Boston University
2005	Jeffrey Jacot “Multiscale Analysis of Arterial Bypass Remodeling”	Ph.D.	BME Boston University
2005	David Michael Foster “Microgrooves Dominate Cyclic Strain Response Of Vascular Smooth Muscle Cell Orientation”	M.S.	BME Boston University
2005	Thomas Steen “Laser Ultrasonic Inspection of Subsurface Defects in Flip-Chips”	M.S.	AME Boston University
2005	John Jagodnik “Finite Element Method Applied to Bone Growth and Tissue Differentiation with Application to Dental Implants”	Ph.D. prospectus	ME Northeastern Univ.
2005	Matthew Heverly “Minimizing Tissue Motion During Needle Insertion”	M.S.	AME Boston University
2004	Erin Leary Swann “Fabrication and Evaluation of Uniformly Sized Nanoporous Alumina for Human Osteoblast Cell Culture”	M.S.	BME Boston University