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Engineering & Scientific Consulting

Sarah Easley, Ph.D., P.E.

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Professional Profile

Dr. Easley specializes in solid mechanics, biomechanics, finite element analysis (FEA), and mechanics of materials. She has extensive experience performing numerical analyses for a wide array of applications, including consumer electronics, medical devices, automotive, aerospace, railcar, and industrial equipment.

Dr. Easley regularly applies her expertise to design evaluation and optimization, and root cause failure analysis in litigation and non-litigation contexts.

Prior to joining Exponent, Dr. Easley's doctoral research focused on using microstructural imaging, experimental testing, and computational analysis to understand the relationship between bone structure and bone strength and the effects of disease and treatment on that relationship. Her earlier graduate research and internship experience focused on design and analysis of orthopaedic biomedical devices. She also has experience using shop equipment, and participated in the design and fabrication of a robot for the national F.I.R.S.T. competition.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of California, Berkeley, 2010

M.S., Mechanical Engineering, University of Denver, 2004

B.S., Computer Engineering, University of Denver, 2001

Outstanding Graduate Student Instructor Award, 2008

Berkeley College of Engineering Fellowship, 2005-2006

University of Denver Alumni Scholar, 1997-2001

Stanley Cibrowksi Foundation Award for Engineering Excellence, 1997-2001

Licenses and Certifications

Professional Engineer Mechanical, California, #36388

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Prior Experience

Research Intern, DePuy Orthopaedics, 2004

Technology Intern, Accenture, 2000

Professional Affiliations

American Society of Mechanical Engineers (member)

ASM International (member)

Publications

Malito, L.G., Briant, P.L., Bowers, M.L., Easley, S., Schaffer, J.E. and James, B., 2022. "Fatigue, Fracture, and Crack Arrest from Bending Induced Pre-strain in Superelastic Nitinol." Shape Memory and Superelasticity, pp.1-13

Easley SK, Chang MT, Shindich D, Hernandez CJ, Keaveny TM. "Biomechanical effects of simulated resorption cavities in cancellous bone across a wide range of bone volume fractions." Journal of Bone and Mineral Research 2012; 27:1927-35.

Easley SK, Jekir MG, Burghardt AJ, Li M, Keaveny TM. "Contribution of the intra-specimen variations in tissue mineralization to PTH- and raloxifene-induced changed in stiffness of rat vertebrae." Bone 2010; 46:1162-1169.

Bevill G, Easley SK, Keaveny TM. "Side-artifact errors in yield strength and elastic modulus for human trabecular bone and their dependence on bone volume fraction and anatomic site." Journal of Biomechanics 2007; 40:338-3388.

Easley SK, Pal S, Tomaszewski PR, Petrella AJ, Rullkoetter PJ, Laz PJ. "Finite element-based probabilistic analysis tool for orthopaedic applications." Computer Methods and Programs in Biomedicine 2007; 85:32-40.

Halloran JP, Easley SK, Petrella AJ, Rullkoetter PJ. "Comparison of deformable and elastic foundation finite element simulations for predicting knee replacement mechanics." Journal of Biomechanical Engineering 2005; 127:813-818.

Book Chapters

Briant P, Easley S. Finite Element Analysis in Post-market Engineering for Medical Devices. In: Computational Modeling and Simulation of Medical Devices, Horner M, Bischoff J, Afshari P (ed), Springer, 2026.

Selected Presentations and Published Abstracts

Briant P, Easley S, Christianson D. Statistical Evaluation of Nitinol Fatigue Using Both Single and Multi-Amplitude Conditions. Shape Memory and Superelastic Technologies Conference, La Jolla, CA, May 2026.

Molnar J, Lovald S, Campbell I, Easley S. Safety Standards and Risk Evaluation for Physical Human-Robot Interaction. Workshop on Public Trust in Autonomous Systems, International Conference on Robotics & Automation, Atlanta, GA, May 2025.

Briant P, Easley S, Lane W, Bowers M, Malito L, Schaffer J, James B. The role of stress state on nitinol

fatigue. Shape Memory and Superelastic Technologies Conference, Konstanz, Germany, May 2019.

Briant P, James B, Easley S, Kennett S, Scahffer J, Kay L. The effect of crimp strain on the fatigue performance of nitinol. Shape Memory and Superelastic Technologies Conference, Chipping Norton, Oxfordshire, UK, May 2015.

Briant P, Siskey R, Rau A, Easley S, James B. Effect of strain rate on nitinol constitutive modeling in the clinically relevant strain range. ASM Materials and Processes for Medical Devices, Minneapolis, MN, August 2011.

Easley SK, Jekir MG, Lu G, Torello D, Li M, Keaveny TM. Lack of effect of ovariectomy and PTH treatment on the biomechanical material properties of bone tissue in rat vertebrae. 31st Annual Meeting of the American Society for Bone and Mineral Research, Denver, CO, 2009.

Easley SK, Jekir MG, Burghardt AJ, Li M, Keaveny TM. Effects of PTH and raloxifene on tissue mineralization and vertebral stiffness in rats. 55th Annual Meeting of the Orthopaedic Research Society, Las Vegas, NV, 2009.

Easley SK, Shindich D, Hernandez CJ, Keaveny TM. Effects of resorption cavities on strength of trabecular bone. 30th Annual Meeting of the American Society for Bone and Mineral Research, Montréal, Canada, 2008.

Easley SK, Jekir MG, Bennett CG, Li M, Keaveny TM. Effect of PTH and raloxifene on cortical and trabecular microstructure, cortical-trabecular load sharing, and tissue material properties of whole rat vertebrae. 54th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA, 2008.

Easley SK, Jekir MG, Kazakia GJ, Majumdar S, Keaveny TM. Role of tissue mineralization, as measured by micro-CT, on apparent and effective tissue elastic moduli of human trabecular bone. 53rd Annual Meeting of the Orthopaedic Research Society, San Diego, CA, 2007.

Easley SK, Rullkoetter PJ. Efficient finite element model prediction of TKR constraint. 52nd Annual Meeting of the Orthopaedic Research Society, Chicago, IL, 2006.

Easley SK, Tomaszewski PR, Petrella AJ, Rullkoetter PJ, Laz PJ. Effect of dimensional variability on hip stem reliability. 7th World Biomaterials Congress, Sydney, Australia, 2004.

Penmetsa J, Easley SK, Petrella AJ, Rullkoetter PJ. Creep of UHMWPE acetabular cups during gait loading. 50th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA, 2004.

Halloran J, Easley SK, Penmetsa J, Laz PJ, Petrella AJ, Rullkoetter PJ. Efficient dynamic finite element rigid body analysis of TJR. American Society of Mechanical Engineers Summer Bioengineering Conference, Key Biscayne, FL, 2003.

Penmetsa J, Easley SK, Petrella AJ, Rullkoetter PJ. Effect of head size, clearance, and poly thickness on creep of acetabular cups. 29th Meeting of the Society for Biomaterials, 2003.