

Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Briant advises clients in understanding and solving complex engineering problems. Drawing on his expertise in mechanical and materials engineering, finite element analysis, biomechanics, and image processing, he has assisted clients in performing a wide array of failure analyses and device evaluations. These analyses span across multiple scales and industries, ranging from automotive, rail, and piping systems to electronic solder joints and implanted medical devices. Dr. Briant's matters commonly involve assessing the root cause of reported multidisciplinary issues.

Dr. Briant's work includes both litigation and non-litigation matters. He has been a designated expert for both product liability and intellectual property matters and has given both deposition and trial testimony in each. His litigation matters have included cardiovascular medical devices, insulin pumps, consumer electronics, automotive components, among other systems and devices. In addition, he has analyzed vibration induced failures of large systems undergoing dynamic events, including piping networks and boilers.

Dr. Briant has extensive experience in long term reliability analysis of medical devices, and he has assisted numerous medical device companies prepare for FDA submission. This work includes both laboratory bench testing of devices and finite element analysis. His medical device analyses have involved cardiovascular implants, insulin pumps, blood glucose sensors, in vitro diagnostic devices, surgical tables, and numerous other products. He has published multiple journal articles and given numerous conference presentations related to fatigue, fracture, and wear of Nitinol, which is commonly used in implanted cardiovascular devices.

Prior to joining Exponent, Dr. Briant's research focused on laboratory and numerical analysis of cartilage tissue mechanics, as well as the design and analysis of orthopaedic biomedical devices. He also obtained experience using lathes, milling machines, and other shop equipment, and participated in the design and fabrication of Washington University's entry to the Formula Society of Automotive Engineers racecar competition.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Stanford University, 2008

M.S., Mechanical Engineering, Stanford University, 2004

B.S., Mechanical Engineering, Washington University in St. Louis, 2002

Veterans Affairs Pre-Doctoral Associated Health Rehabilitation Research Fellowship, 2006

Stanford Graduate Fellowship, 2002

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Antoinette Francis Dames Award, 2002

Licenses and Certifications

Professional Engineer Mechanical, California, #34711

Professional Affiliations

American Society of Mechanical Engineers (member)

Patents

US Patent 12,001,765 B2: Textile-Materials Model For Vibroacoustic Structural Simulation, June 2024 (Shumaker LC, Raghupathy AP, Chakravartula AY, Torrie D, Ho JP, Cheng L, Dixit NR, Briant PL, Spak KS, Agarwal G, Mennitt D).

U.S. Patent Application Number 20160259480: Calibration of Haptic Devices (P. Augenbergs, M. Piche, V. Chawda, N. Wells, S. McEuen, C. Wiederhold, J. Harley, W. Westerman, J. Bernstein, B. Degner, P. Briant, T. Wedlick).

Publications

Malito LG, Briant PL, Bowers ML, Easley S, Schaffer JE, James B. Fatigue, fracture, and crack arrest from bending induced pre-strain in superelastic nitinol. Shape Memory and Superelasticity 2022; 1–13.

Malito LG, Bowers ML, Briant PL, Ganot GS, James B. Fatigue fracture of nitinol. J Fail. Anal. and Preven 2022; 22:441–445.

Briant P, Bischoff JE, Dharia M, Le Navéaux F, Li X, Kulkarni S, Levine D, Ramos D, Afshari P Use of real-world data for enhancing model credibility: applications to medical device development. ASME. J. Med. Devices. 2022; 16(3):031001.

Kreuzer SM, Briant PL, Ochoa JA. Establishing the biofidelity of a multiphysics finite element model of the human heart. Cardiovasc Eng Technol. 2021; 12(4):387–397.

Adler P, Frei Rudolf, Kimiecik M, Briant P, James B, Liu Chuan. Effects of tube processing on the fatigue life of nitinol. Special Issue: Shape Memory and Superelastic Technologies Conference 2017; 4:197–217. Invited Paper.

Briant P, Bevill S, Andriacchi T. Cartilage strain distributions are different under the same load in the central and peripheral tibial plateau regions. Journal of Biomechanical Engineering 2015; 137(12):1210091–1210097.

Bevill S, Briant P, Levenston M, Andriacchi T. Central and peripheral region tibial plateau chondrocytes respond differently to in vitro dynamic compression. Osteoarthritis and Cartilage 2010; 17(8):980–987.

Chaudhari A, Briant P, Bevill S, Koo S, Andriacchi T. Knee kinematics, cartilage morphology, and osteoarthritis after ACL injury. Medicine and Science in Sports and Exercise 2008; 40(2):215–222.

Andriacchi T, Briant P, Bevill S, Koo S. Rotational changes at the knee after ACL injury cause cartilage thinning. Clinical Orthopaedics and Related Research 2006; 442:39–44.

Invited Lectures

Engineering Failure Analysis, Brown University, November 2018.

Book Chapters

Malito LG, Bowers ML, Briant P, Ganot GS, James B. Fractography of Nitinol. ASM Metals Handbook Volume 12. 2024; 430-440

Wu M, Briant P. The use of finite element analysis in design, life prediction, and failure analysis of biomaterials and medical devices. In: Degradation of Implant Materials. Eliaz, Noam (ed), Springer, 2013.

Briant P, Andriacchi T. Joint biomechanics: The role of mechanics in joint pathology. In: Kelley's Textbook of Rheumatology, 2007.

Selected Presentations and Published Abstracts

Briant P, Chin D, Malito L, Robertson S, Gulker B, Metcalf J. Nitinol wire wear performance. CVID, Asilomar, CA, October 2025.

Briant P. Evaluating fatigue and creep performance of polymers for medical devices. MD&M, Minneapolis, MN, October 2024.

Briant P, Malito L, Haghgouyan B, Schaffer J. Cumulative nitinol fatigue with statistical evaluation. Shape Memory and Superelastic Technologies Conference, Cascais, Portugal, May 2024.

Malio L, Haghgouyan B, Gorji M, Briant P, Aminahmadi B, Robertson S. The effect of small cracks on the bending fatigue superelastic nitinol. Shape Memory and Superelastic Technologies Conference, Cascais, Portugal, May 2024.

Haghgouyan B, Malito L, Aminahmadi B, Briant P. Fracture of NiTi under constant-displacement thermomechanical loading. Shape Memory and Superelastic Technologies Conference, Cascais, Portugal, May 2024.

Robertson S, Pequegnat A, Clever J, Moura M, Malito L, Haghgouyan B, Briant P, Duerig T. Are modern "cold" Femto laser-cut components truly HAZ-free? Shape Memory and Superelastic Technologies Conference, Cascais, Portugal, May 2024.

Briant P, Malito L, Schaffer J, Hamilton T. Cumulative fatigue of nitinol due to multiple applied cyclic strains. Shape Memory and Superelastic Technologies Conference, Carlsbad, CA, May 2022.

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.

Malito L, Bowers M, Briant P, Shamimi A, Duerig T. Determination of the critical flaw size for crack growth in nitinol material used for biomedical applications through focused ion beam notch fatigue. Shape Memory and Superelastic Technologies Conference, Konstanz, Germany, May 2019.

Adler P, Frei R, Bowers M, Briant P, James B, Liu C. Effects of tube processing on the fatigue life of nitinol – Part 2. Shape Memory and Superelastic Technologies Conference, Konstanz, Germany, May 2019.

Briant P, Kimiecik M, James B. Analysis of nitinol wear performance. Shape Memory and Superelastic Technologies Conference, San Diego, CA, May 2017.

Briant P, Kreuzer S, Ochoa J. The Abaqus Living Heart: Comparison to static and dynamic in vivo measurements. ASME Verification and Validation Symposium, May 2016.

Briant P, James B, Easley S, Kennett S, Schaffer 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, James B. Sensitivity of calculated strains in nitinol to geometric, material, and load variations. ASME Verification and Validation Symposium, May 2014.

Briant P, Lieberman S, James B. Residual stress distribution in MP35N due to plastic deformation and comparison to finite element analysis. International Medical Device Conference and Expo, Chicago, IL, October 2011.

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.

Briant P, Bevill S, Andriacchi T. Quantifying variations in collagen matrix deformation in loaded articular cartilage. ASME Summer Bioengineering Conference, Keystone, CO, June 2007.

Bevill S, Briant P, Andriacchi T. Numerical and experimental analysis of articular chondrocyte deformation: calibration of multiscale finite element model. ASME Summer Bioengineering Conference, Keystone, CO, June 2007.

Briant P, Rylander J, Bevill S, Andriacchi T. Effects of altered loading on collagen matrix deformation in articular cartilage. 53rd Annual Meeting of the Orthopaedic Research Society, San Diego, CA, February 2007.

Bevill S, Briant P, Andriacchi T. Regional variations in chondrocyte morphology as a cause for cartilage degeneration following kinematic changes to normal joint function. 53rd Annual Meeting of the Orthopaedic Research Society, San Diego, CA, February 2007.

Briant P, Bevill S, Torzilli P, Andriacchi T. Collagen organization in the superficial layer of articular cartilage relative to the mechanical environment within the joint. ASME Summer Bioengineering Conference, Amelia Island, FL, June 2006.

Briant P, Bevill S, Koo S, Andriacchi T. A potential mechanism for the initiation of osteoarthritis at the knee following ACL injury. ASME Summer Bioengineering Conference, Vail, CO, June 2005.