

Exponent®
Engineering & Scientific Consulting

Joe Pearson, Ph.D.

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Professional Profile

Dr. Pearson provides technical expertise in the area of biomechanics, with a particular interest in tissue and joint mechanics and applications for injury mechanism assessment. His educational and research backgrounds combine bioengineering with a focus on engineering mechanics and biomedical engineering.

Dr. Pearson's research has involved understanding how musculoskeletal tissue injuries occur and developing material systems that mimic tissue structure and function to improve healing and mechanical stability. His knowledge of the relationship between injury and biomechanics applies directly towards investigating biomechanical accidents and related injuries. At Exponent, he has investigated injuries related to motor vehicle accidents and slips and falls.

Prior to joining Exponent, Dr. Pearson completed postdoctoral research at the Georgia Institute of Technology focusing on delivering therapeutics to reduce injury after rotator cuff tears in the shoulder joint. During his doctoral studies in biomedical engineering at the University of Texas at San Antonio and UT Health, he examined mechanically-stable material systems designed to replace torn knee joint tissue and designed an in vitro mechanical stimulation regimen with cells to improve the potential success of the systems. He also evaluated the biomechanical properties of bone tissue and related materials, vocal fold injections, muscle contraction, and tendon reconstruction surgical techniques.

In addition to his academic research, Dr. Pearson has prior experience investigating automobile accidents as an adjuster. He was formerly an officer in the Air Force, which provides him with an enhanced understanding of situations involving military personnel.

Academic Credentials & Professional Honors

Ph.D., Biomedical Engineering, University of Texas, San Antonio, 2019

M.S., Biomedical Engineering, University of Texas, San Antonio, 2016

B.S., Bioengineering, Penn State University, 2009

Carlos Alvarez Endowment Fellowship, 2017

Licenses and Certifications

Certified Crash Data Retrieval (CDR) Technician

FAA Remote Pilot Certificate

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Northwestern University Center for Public Safety, Traffic Crash Reconstruction for Engineers

Prior Experience

Postdoctoral Researcher, Georgia Institute of Technology, 2019-2023

Graduate Research Assistant, University of Texas at San Antonio, 2014-2019

Instructor – Technology/Engineering/Math (TEM) Academic Inquiry, University of Texas at San Antonio, 2017-2018

Tissue Mechanics Course Teaching Assistant, University of Texas at San Antonio, 2016-2017

Senior Design Course Teaching Assistant, University of Texas at San Antonio, 2016-2017

Auto Adjuster, United Services Automobile Association (USAA), 2013

Officer, United States Air Force, 2009-2012

Professional Affiliations

Biomedical Engineering Society (BMES)

Orthopaedic Research Society (ORS)

Society of Automotive Engineers (SAE)

Golden Key International Honor Society

Phi Kappa Phi Honor Society

Publications

Rapp van Roden EA, Miller B, Pearson J, Williamson J, and Brown T. Revisiting Rear Seat Safety: Field Evaluations of Relative Injury Risk Across Seating Positions and the Integration of Advanced Rear Seat Belt Systems. SAE Technical Paper 2026-01-0561.

Pearson JJ, Chiou G, Rahman ML, Gonzalez G, Bizios R, Ong JL, Guda T. Dynamic Mineralization and Calcitriol Supplementation Promote Osteogenic Differentiation on Silk Scaffolds In Vitro. Biomedical Materials & Devices. 2025; 1-12.

Fukunaga T, Pearson JJ, Miller RC, Zhang C, Lakrat M, Haglund L, Diaz-Hernandez M, Temenoff JS, Drissi H. PDGF-Releasing Hydrogels for Enhanced Proliferation of Human Nucleus Pulposus Cells. Journal of Biomedical Materials Research Part A. 2025; 113(5).

McFaline-Figueroa J, Raymond-Pope CJ, Pearson JJ, et al. Advancing β-adrenoreceptor Agonism for Recovery After Volumetric Muscle Loss Through Regenerative Rehabilitation and Biomaterial Delivery Approaches. Regenerative Biomaterials. 2025; 12:1-16.

Pearson JJ, Mao J, Temenoff JS. Effects of Release of TSG-6 from Heparin Hydrogels on Supraspinatus Muscle Regeneration. Tissue Engineering Part A. 2025; 31(3-4):195-207.

Anderson LE, Tellier LE, Shah KR, Pearson JJ, Brimeyer AL, Botchwey EA, Temenoff JS. Bone Marrow Mobilization and Local Stromal Cell-Derived Factor-1α Delivery Enhances Nascent Supraspinatus Muscle

Fiber Growth. Tissue Engineering Part A. 2024; 30(1-2):45-60.

Treviño EA, Shah J, Pearson JJ, Platt MO, Xia Y, Temenoff JS. Microfluidic platform for microparticle fabrication and release of a cathepsin inhibitor. Tissue Engineering Part C. 2023; 29(8):361-70.

Doron G, Pearson JJ, Guldberg RE, Temenoff JS. Development and characterization of Factor Xa-responsive materials for applications in cell culture and biologics delivery. J Biomed Mater Res. 2023; 634-43.

Ong JL, Shiels SM, Pearson JJ, Karajgar S, Miar S, Chiou G, Appleford MR, Wenke JC, Guda T. Spatial recombinant Human Bone Morphogenetic Protein 2 delivery from hydroxyapatite scaffolds sustains bone regeneration in rabbit radius. Tissue Engineering Part C. 2022; 28(7):363-74.

Pearson JJ, Temenoff JS. Growth factor immobilization strategies for musculoskeletal disorders. Current Osteoporosis Reports. 2022; 20:13-25.

Anderson LE, Pearson JJ, Brimeyer AL, Temenoff JS. Injection of micronized human amnion/chorion membrane results in increased early supraspinatus muscle regeneration in a chronic model of rotator cuff tear. Annals of Biomedical Engineering. 2021; 49(12):3698-710.

Miar S, Pearson JJ, Montelongo SA, Zamilpa R, Betancourt AM, Ram B, Navara C, Appleford MR, Ong JL, Griffey S, Guda T. Regeneration enhanced in critical-sized bone defects using bone-specific extracellular matrix protein. Journal of Biomedical Materials Research Part B. 2021; 109(4):538-47.

Pearson JJ, Gerken N, Bae C, Lee KB, Satsangi A, McBride S, Appleford MR, Dean DD, Hollinger JO, Ong JL, Guda T. In vivo hydroxyapatite scaffold performance in infected bone defects. Journal of Biomaterials Research Part B. 2019; 108(3):1157-66.

Pearson JJ, Ortiz AS, Montelongo SA, Simpson CB, Guda T, Dion GR. Quantification of injection force mechanics during injection laryngoplasty. Laryngoscope. 2019;129(5): 1060-66.

Ma L, Hua R, Cheng H, Fajardo RJ, Pearson JJ, Guda T, Shropshire DB, Gu S, Jiang JX. Connexin 43 hemichannels protect bone loss during estrogen deficiency. Bone Research. 2019; 7(11): 1-12.

Gaviria L, Pearson JJ, Montelongo SA, Guda T, Ong JL. Three-dimensional printing for craniomaxillofacial regeneration. Journal of the Korean Association of Oral and Maxillofacial Surgeons. 2017; 43(5):288-98.

Pearson JJ, Ong JL, Guda T. Infection-related considerations for bone grafts. Translating Biomaterials for Bone Graft: Bench-top to Clinical Applications: CRC Press; 2016; 139-58.

Long TC, Pearson JJ, Hankinson AC, Deutsch S, Manning KB. An in vitro fluid dynamic study of pediatric cannulae: The value of animal studies to predict human flow. Journal of Biomechanical Engineering. 2012; 134(4):044501.

Presentations

Pearson JJ, Mao J, Temenoff JS. Effects of Heparin Hydrogel Sulfation Level on TSG-6 Release and Tissue Response After Supraspinatus Muscle Injury. Oral presentation, Tissue Engineering and Regenerative Medicine International Society 7th World Congress, Seattle, WA, 2024.

Pearson JJ, Wilch LE, Temenoff JS. MMP-responsive, heparin-containing hydrogel particles for TSG-6 delivery to rotator cuff muscle. Poster presentation, Society for Biomaterials Annual Meeting and Exposition, San Diego, CA, 2023.

Pearson JJ, Wilch LE, Willett NJ, Temenoff JS. Collagenase-responsive delivery systems for rotator cuff

muscle treatments. Oral presentation, 3rd International Conference on Musculoskeletal and Neural Interactions, Atlanta, GA, 2022.

Pearson JJ, Gonzalez GA, Sanchez KR, Ong JL, Guda T. Dynamic in vitro stimulation and vitamins to promote enthesis regeneration. Oral presentation, Society for Biomaterials Annual Meeting and Exposition, Seattle, WA, 2019.

Pearson JJ, Gonzalez GA, Cole B, Ong JL, Guda T. Development of a collagen and biomineralized silk bone-ligament-bone graft. Poster presentation, Biomedical Engineering Society Annual Meeting, Atlanta, GA, 2018.

Pearson JJ, Gonzalez GA, Sanchez KR, Ong JL, Guda T. Ascorbic acid and calcitriol effects on stem cell differentiation and collagen type on silk. Poster presentation, Society for Biomaterials Annual Meeting and Exposition, Atlanta, GA, 2018.

Pearson JJ, Wang H, Guda T, Dean D, Chen X, Ong J, Yeh C. Optimization of silk substrate and fibronectin coating for salivary niche regeneration. Poster presentation, Society for Biomaterials Annual Meeting and Exposition, Atlanta, GA, 2018.

Pearson JJ, Montelongo SA, Guda T, Dion GR. Biomechanical evaluation of injectable biomaterials for vocal fold augmentation. Poster presentation, Society for Biomaterials Annual Meeting and Exposition, Atlanta, GA, 2018.

Pearson JJ, Dowell PE, Sanchez KR, Ong JL, Guda T. Ascorbic acid and tunable mechanics of silk scaffolds maintain tissue cell niche. Poster presentation, Society for Biomaterials Annual Meeting and Exposition, Minneapolis, MN, 2017.

Guda T, Shiels SM, Pearson JJ, Karajgar S, Appleford M, Wenke JC, Ong JL. Improved bone regeneration with reduced rhBMP-2 doses when combined with hydroxyapatite and collagen. Poster presentation, Orthopedic Research Society Annual Conference, Orlando, FL, 2016.

Saucedo JM, Huang JI, Jensen S, Pearson JJ, Guda T. Safe anatomic repair of the distal biceps tendon with single incision and cortical button: A biomechanical study of a novel technique. Poster presentation, Orthopedic Research Society Annual Conference, Orlando, FL, 2016.