David Michael Pierce

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Overview

The *driving interest of my research* is to understand and predict the mechanics of soft tissues and engineering materials. Innovating at the intersection of imaging, image analysis, machine learning, biology, physiology, and experimental and computational mechanics, the *overarching aim* of my lab (Interdisciplinary Mechanics Laboratory) is to establish a *multi-modal, virtual human cartilage*—a patient-specific analysis framework—to integrate diverse data and unlock previously unapproachable lines of research. *Key contributions to science* include: (1) measure, understand, and predict the mechanics and damage mechanics of cartilage and other soft tissues; (2) image, test, and analyze networks of collagen fibers to understand mechanics and damage mechanisms in soft tissues; (3) establish and implement image-driven constitutive models and novel finite-element (FE) simulations of sample- and patient-specific cartilage; (4) determine theoretically consistent initial and residual strain/stress states for FE simulations of soft tissues to improve prediction fidelity; and (5) quantify and predict the reliability of MEMS and electronics systems to advance simulation-driven design. My *long-term research vision* is to advance and fundamentally shape engineering and adjacent fields. Our research team aims to establish three fundamental shifts: (1) from classical passive solid mechanics to the mechanics of functional/degenerative biomechanical adaptation, (2) from continuum to multi-scale modeling (replacing phenomenological parameters with microscopically derived and structurally motivated equivalents), and (3) from purely empirical medicine to medical practice integrated with patient-specific biomechanical analyses. My *teaching experience* spans instruction, outreach, and mentorship, through which I strive to inspire enthusiasm for engineering and to combat prejudice, discrimination, and stigma in STEM.

Education

Graz University of Technology *Graz, Austria*
Habilitation (Venia Legendi) Experimental and Computational Biomechanics (Advisor G.A. Holzapfel) (7/13)
- Thesis: Constitutive Modeling of Articular Cartilage.
- Focus: Solid biomechanics, continuum mechanics, constitutive modeling, finite element analysis, and computer programming.

Stanford University *Stanford, California*
Ph.D. Mechanical Engineering (Advisor S.D. Sheppard) (9/07)
- Thesis: Continuum Damage Mechanics Based Failure Prediction Methodology for 95.5Sn-3.9Ag-0.6Cu Solder Alloy Interconnects in Electronic Packaging.
- Focus: Theory of finite element analysis, solid mechanics, continuum mechanics, constitutive modeling, fracture and fatigue analysis, and computer programming.

Ph.D. Minor Mathematics (Advisor R. Mazzeo) (9/07)
- Focus: Partial differential equations of applied mathematics, computational methods for fronts, interfaces and waves, real analysis, and linear algebra and matrix theory.

M.S. Mechanical Engineering (Advisor B. Roth) (1/01)
- Focus: Design methodology with emphasis on computational analysis tools.

University of Minnesota *Minneapolis, Minnesota*
B.S. Mechanical Engineering (6/97)
- Focus: Mechanical design, mechanics, and finite element analysis.

Academic Experience

Sigrid Jusélius Visiting Professor (8/25–present)
Department of Technical Physics
University of Eastern Finland, Kuopio, Finland

Associate Director (8/24–present)
Center for Biomedical and Bioengineering Innovation
University of Connecticut. Storrs, Connecticut

Professor (8/23–present)
School of Mechanical, Aerospace, and Manufacturing Engineering
Department of Biomedical Engineering/Department of Mathematics
University of Connecticut. Storrs, Connecticut

W.W. Clyde Visiting Chair (7/24–6/25)
John and Marcia Price College of Engineering
University of Utah. Salt Lake City, Utah

Interim Department Head (7/22–8/23)
Department of Biomedical Engineering
University of Connecticut. Storrs, Connecticut

Director of Graduate Studies (1/20–6/22)
Department of Mechanical Engineering
University of Connecticut. Storrs, Connecticut

Associate Professor (8/18–8/23)
Departments of Mechanical Engineering/Biomedical Engineering/Mathematics
University of Connecticut. Storrs, Connecticut

Assistant Professor (8/13–8/18)
Departments of Mechanical Engineering/Biomedical Engineering/Mathematics
University of Connecticut. Storrs, Connecticut

Associate Professor (8/13)
Institute of Biomechanics
Graz University of Technology. Graz, Austria

Vice Head (9/07–8/13)
Institute of Biomechanics
Graz University of Technology. Graz, Austria

Universitätsassistent (Assistant Professor) (9/07–8/13)
Institute of Biomechanics
Graz University of Technology. Graz, Austria

Publications

Book Chapters

— Published —

4. Feng, B., D.M. Pierce, The Biomechanics of Distal Colon and Rectum and Its Relevance to Visceral Pain, In: S. Brierley, N. Spencer (Eds), *Visceral Pain*, Springer Nature, Berlin, DE, 2022.

3. Pierce, D.M., T. Ricken, C.P. Neu, Image-Driven Constitutive Modeling for FE-Based Simulation of Soft Tissue Biomechanics, In: M. Cerrolaza, S. Shefelbine, D. Garzón-Alvarado (Eds), *Numerical Methods and Advanced Simulation in Biomechanics and Biological Processes*, 55–76, Elsevier, Cambridge, MA, 2018.

2. Cai, L., C.P. Neu and D.M. Pierce, Combining Multi-Modal MR Imaging and Biomechanical Modeling to Investigate the Response of Cartilage and Chondrocytes to Mechanical Stimuli, In: Y. Xia, K.I. Momot (Eds), *Biophysics and Biochemistry of Cartilage by NMR and MRI*, 395–432, The Royal Society of Chemistry, London, UK, 2017.

1. Štrbac, V., D.M. Pierce, J. Vander Sloten, N. Famaey, GPU-Based Fast Finite Element Solution for Nonlinear Anisotropic Material Behavior and Comparison of Integration Strategies, In: G.R. Joldes, B. Doyle, A. Wittek, P.M.F. Nielsen, K. Miller (Eds), *Computational Biomechanics for Medicine: Imaging, Modeling and Computing*, 97–105, Springer International Publishing, Cham, CH, 2016.

Refereed Journal Papers

— Submitted for Review —

76. Hislop, B.D., K. Safari, M.M. Rahman, C.M. Heveran, D.M. Pierce, R.K. June, Permeability of Bone and Cartilage and Stiffness of Collagen Network within Cartilage Impact Osteochondral Fluid Transport During Cyclic Compression: A Study in Finite Elements.

75. Safari, K., A. Almasi, P. Szarek, D.M. Pierce, Integrating Multiscale FE2M Simulations and Experiments to Predict Microcrack Damage in Cartilage.

74. Safari, K., R.K. June, D.M. Pierce, Computational Analyses of Agarose Constructs to Establish Mechanobiological Conditions for Experiments.

73. Gandhi, V., S.A. Arqub, D.M. Pierce, S. Yadav, M. Upadhyay, Where is the Center of Resistance of a Maxillary Canine? A 3-Dimensional Finite Element Analysis.

72. Shokrani, A., A. Seck, K. Hoshino, B. Feng, D.M. Pierce, Colorectum and Embedded Networks of Nerve Fibers Present Auxetic Responses During Uniaxial Circumferential Extension.

— Published —

71. Gandhi, V., S.A. Arqub, D.M. Pierce, S. Yadav, M. Upadhyay, Center of Resistance of Maxillary Canines: A 3D Computational Model for Orthodontic Applications, *European Journal of Orthodontics*, 47(6):cjaf097, 2025.

70. Shokrani, A., A. Seck, B. Feng, D.M. Pierce, Methods for Quantitative Analyses of Nerve Fiber Deformation in the Myenteric Plexus Under Loading of Mouse Distal Colon and Rectum, *Medical Engineering & Physics*, 146:104444, 2025.

69. Egli, F.S., S.M. Seyedpour, M. Pachenari, D.M. Pierce, T. Ricken, Computational Modeling of Articular Cartilage: Mechanical Experiments, Sensitivity Analyses, Parameter Identification, and Validation, *Acta Biomaterialia*, 204:429–445, 2025.

68. Almasi, A., T. Ricken, D.M. Pierce, Finite Elements of Multiscale Mixtures (FE2M) in Three Dimensions: Theory, Numerical Implementation, and Analyses, *Computational Mechanics*, 2025. https://doi.org/10.1007/s00466-025-02669-3

67. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, Predicting the Heterogeneous Chemo-Mechano-Biological Degeneration of Cartilage Using 3-D Biphasic Finite Elements, *Computer Methods and Programs in Biomedicine*, 270:108902, 2025.

66. Safari, K., B. Rodriguez-Vila, D.M. Pierce, Automated Detection of Microcracks within Second Harmonic Generation Images of Cartilage Using Deep Learning, *Journal of Orthopaedic Research*, 43(6):1101–1112, 2025.

65. Szarek, P., D.M. Pierce, On the Mechanics of Networked Type II Collagen: Experiments, Constitutive Modeling, and Validation, *Acta Biomaterialia*, 193:267–278, 2025.

64. Shokrani, A., A. Almasi, B. Feng, D.M. Pierce, Understanding Mechanotransduction in the Distal Colon and Rectum via Multiscale and Multimodal Computational Modeling, *Journal of the Mechanical Behavior of Biomedical Materials*, 160:106771, 2024.

63. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, A Chemo-Mechano-Biological Modeling Framework for Cartilage Evolving in Health, Disease, Injury, and Treatment, *Computer Methods and Programs in Biomedicine*, 231:107419, 2023.

62. Rodriguez-Vila, B., V. Gonzalez-Hospital, E. Puertas, J.-J. Beunza, D.M. Pierce, Democratization of Deep Learning for Segmenting Cartilage from MRIs of Human Knees: Application to Data from the Osteoarthritis Initiative, *Journal of Orthopaedic Research*, 41(8):1754–1766, 2023.

61. Wilson, R.L., N.C. Emery, D.M. Pierce, C.P. Neu, Spatial Gradients of Quantitative MRI as Biomarkers for Early Detection of Osteoarthritis: Data from Human Explants and the Osteoarthritis Initiative, *Journal of Magnetic Resonance Imaging*, 58(1):189–197, 2023.

60. Schneider, S.E., A.K. Scott, B. Seelbinder, C. Van Den Elzen, R.L. Wilson, E.Y. Miller, Q. Beato, S. Ghosh, J.E. Barthold, J. Bilyeu, N.C. Emery, D.M. Pierce, C.P. Neu, Dynamic Biophysical Responses of Neuronal Cell Nuclei and Cytoskeletal Structure Following High Impulse Loading, *Acta Biomaterialia*, 163:339–350, 2023.

59. Szarek, P.E., D.M. Pierce, A Specialized Protocol for Mechanical Testing of Isolated Networks of Type II Collagen, *Journal of the Mechanical Behavior of Biomedical Materials*, 136:105466, 2022.

58. Zhao, Y., B. Feng, D.M. Pierce, Predicting the Micromechanics of Embedded Nerve Fibers using a Novel Three-layered Model of Mouse Distal Colon and Rectum, *Journal of the Mechanical Behavior of Biomedical Materials*, 127:105083, 2022.

57. Santos, S., C.P. Neu, J.J. Grady, D.M. Pierce, Genipin Does Not Reduce the Initiation or Propagation of Microcracks in Collagen Networks of Cartilage, *Osteoarthritis and Cartilage Open*, 4(1):100233, 2022.

56. Seyedpour, S.M., S. Nafisi, M. Nabati, D.M. Pierce, J.R. Reichenbach, T. Ricken, Magnetic Resonance Imaging-Based Biomechanical Simulation of Cartilage: A Systematic Review, *Journal of the Mechanical Behavior of Biomedical Materials*, 126:104963, 2022.

55. Zhao, Y., S. Siri, B. Feng, D.M. Pierce, Toward Elucidating the Physiological Impacts of Residual Stresses in the Colorectum, *ASME Journal of Biomechanical Engineering*, 144(1):011008 (9 pages), 2022.

54. Pierce, D.M., Multi-Phase, Large-Strain Constitutive Models of Cartilage for Finite Element Analyses in 3-D, *Archive of Applied Mechanics*, 92:513–528, 2022.

53. Guo, T., S. Patel, D. Shah, L. Chi, S. Emadi, D.M. Pierce, M. Han, P. Brumovski, B. Feng, Optical Clearing Reveals TNBS-Induced Morphological Changes of VGLUT2-Positive Nerve Fibers in Mouse Colorectum, *American Journal of Physiology-Gastrointestinal and Liver Physiology*, 320(4):G644–G657, 2021.

52. Santos, S., K. Richard, M.C. Fisher, C.N. Dealy, D.M. Pierce, Chondrocytes Respond Both Anabolically and Catabolically to Impact Loading Generally Considered Non-Injurious, *Journal of the Mechanical Behavior of Biomedical Materials*, 115:104252, 2021.

51. Flanagan D., B.A. Fisher, C. Ciardiello, V. Moreno, A. Uvalic, J. Winsor, M. Rubano, E. Howard, G. Lykotrafitis, D.M. Pierce, A Theoretical Iteration for Predicting the Feasibility for Immediate Functional Dental Implant Loading, *Journal of Oral Implantology*, 47(4):310–317, 2021.

50. Wang, X., R. June, D.M. Pierce, A 3-D Constitutive Model for Finite Element Analyses of Agarose with a Range of Gel Concentrations, *Journal of the Mechanical Behavior of Biomedical Materials*, 114:104150, 2021.

49. Zhao, Y., S. Siri, B. Feng, D.M. Pierce, Computational Modeling of Mouse Colorectum Capturing Longitudinal and Through-thickness Biomechanical Heterogeneity, *Journal of the Mechanical Behavior of Biomedical Materials*, 113:104127, 2021.

48. Maier, F., S. Siri, S. Santos, L. Chen, B. Feng, D.M. Pierce, The Heterogeneous Morphology of Networked Collagen in Distal Colon and Rectum of Mice Quantified Via Nonlinear Microscopy, *Journal of the Mechanical Behavior of Biomedical Materials*, 113:104116, 2021.

47. Gandhi, V., B. Luu, R. Dresner, D.M. Pierce, M. Upadhyay, Where is the Center of Resistance of a Maxillary First Molar? A 3-Dimensional Finite Element Analysis, *American Journal of Orthodontics & Dentofacial Orthopedics*, 160(3):442–450.e1, 2021.

46. Zhao, Y., S. Siri, B. Feng, D.M. Pierce, The Macro- and Micro-Mechanics of Distal Colon and Rectum II: Theoretical and Computational Methods, *MDPI Bioengineering*, 7(4):152, 2020.

45. Siri, S., Y. Zhao, F. Maier, D.M. Pierce, B. Feng, The Macro- and Micro-Mechanics of Distal Colon and Rectum I: Experimental Evidence, *MDPI Bioengineering*, 7(4):130, 2020.

44. Szarek, P.E., M.B. Lilledahl, N.C. Emery, C.G. Lewis, D.M. Pierce, The Zonal Evolution of Collagen-Network Morphology Quantified in Early Osteoarthritic Grades of Human Cartilage, *Osteoarthritis and Cartilage Open*, 2:100086, 2020.

43. Zhao, Y., B. Feng, J. Lee, N. Lu, D.M. Pierce, A Multi-Layered Model of Human Skin Elucidates Mechanisms of Wrinkling in the Forehead, *Journal of the Mechanical Behavior of Biomedical Materials*, 105:103694, 2020.

42. Marshall, L., A. Tarakanova, P. Szarek, D.M. Pierce, Cartilage and Collagen Mechanics Under Large-Strain Shear Within In Vivo and at Supraphysiogical Temperatures, *Journal of the Mechanical Behavior of Biomedical Materials*, 103:103595, 2020.

41. Luu, B., E.A. Cronauer, V. Gandhi, J. Kaplan, D.M. Pierce, M. Upadhyay, A Finite Element approach for locating the Center of Resistance of Maxillary Teeth, *Journal of Visualized Experiments*, 158:e60746, 2020.

40. Zhao, Y., B. Feng, J. Lee, N. Lu, D.M. Pierce, A Multi-layered Computational Model for Wrinkling of Human Skin Predicts Aging Effects, *Journal of the Mechanical Behavior of Biomedical Materials*, 103:103552, 2020.

39. Wang, X., C.P. Neu, D.M. Pierce, Advances Toward Multiscale Computational Models of Cartilage Mechanics and Mechanobiology, *Current Opinion in Biomedical Engineering*, 11:51–57, 2019.

38. Argote, P.F., J.T. Kaplan, A. Poon, X. Xu, N.C. Emery, D.M. Pierce, C.P. Neu, Chondrocyte Viability is Lost During High-Rate Impact Loading by Transfer of Amplified Strain, But Not Stress, to Pericellular and Cellular Scales, *Osteoarthritis and Cartilage*, 27(12):1822–1830, 2019.

37. Siri, S., F. Maier, S. Santos, D.M. Pierce, B. Feng, The Load-Bearing Function of the Colorectal Submucosa and its Relevance to Visceral Nociception Elicited by Mechanical Stretch, *American Journal of Physiology-Gastrointestinal and Liver Physiology*, 317(3):G349–G358, 2019.

36. Santos, S., N.C. Emery, C.P. Neu, D.M. Pierce, Propagation of Microcracks in Collagen Networks of Cartilage Under Mechanical Loads, *Osteoarthritis and Cartilage*, 27(9):1392–1402, 2019.

35. Maier, F., C.G. Lewis, D.M. Pierce, Through-Thickness Patterns of Shear Strain Evolve in Early Osteoarthritis, *Osteoarthritis and Cartilage*, 27(9):1382–1391, 2019.

34. Siri, S., F. Maier, L. Chen, S. Santos, D.M. Pierce, B. Feng, Differential Biomechanical Properties of Mouse Distal Colon and Rectum Innervated by the Splanchnic and Pelvic Afferents, *American Journal of Physiology-Gastrointestinal and Liver Physiology*, 316(4):G473–G481, 2019.

33. Maier, F., C.G. Lewis, D.M. Pierce, The Evolving Large-Strain Shear Responses of Progressively Osteoarthritic Human Cartilage, *Osteoarthritis and Cartilage*, 27(5):810–822, 2019.

32. Wang, X., T.S.E. Eriksson, T. Ricken, D.M. Pierce, On Incorporating Osmotic Prestretch/Prestress in Image-Driven Finite Element Simulations of Cartilage, *Journal of the Mechanical Behavior of Biomedical Materials*, 86(0):409–422, 2018.

31. Kumar, R., D.M. Pierce, V. Isaksen, C. de Lange Davies, J.O. Drogset, M.B. Lilledahl, Comparison of Compressive Stress Relaxation Behavior in Osteoarthritic (ICRS Graded) Human Cartilage, *International Journal of Molecular Sciences*, 19(2): pii:E413, 2018.

30. Štrbac, V., D.M. Pierce, J. Vander Sloten, N. Famaey, GPGPU-Based Explicit Finite Element Computations for Applications in Biomechanics: The Performance of Material Models, Element Technologies and Hardware Generations, *Computer Methods in Biomechanics and Biomedical Engineering*, 20(16):1643–1657, 2017.

29. Rodriguez-Vila, B., P. Sánchez-González, I. Oropesa, E.J. Gómez, D.M. Pierce, Automated Hexahedral Meshing of Knee Cartilage Structures – Application to Data from the Osteoarthritis Initiative, *Computer Methods in Biomechanics and Biomedical Engineering*, 20(14):1543–1553, 2017.

28. Štrbac, V., D.M. Pierce, J. Vander Sloten, N. Famaey, Rupture Risk in Abdominal Aortic Aneurysms: A Realistic Assessment of the Explicit GPU Approach, *Journal of Biomechanics*, 56(0):1–9, 2017.

27. Zhang, Y., K. Abiraman, H. Li, D.M. Pierce, A.V. Tzingounis, G. Lykotrafitis, Modeling of the Axon Membrane Skeleton Structure and Implications for its Mechanical Properties, *PLOS Computational Biology*, 13(2):e1005407, 2017.

26. Santos, S., F.S. Maier, D.M. Pierce, Anisotropy and Heterogeneity of Bovine Articular Cartilage Under Large-Strain Shear, *Journal of Biomechanics*, 52(0):74–82, 2017.

25. Kaleem, B., F.S. Maier, H. Drissi, D.M. Pierce, Low-Energy Impact of Human Cartilage: Predictors for Microcracking the Network of Collagen, *Osteoarthritis and Cartilage*, 25(4):544–553, 2017.

24. Kaplan, J.T., C.P. Neu, H. Drissi, N.C. Emery, D.M. Pierce, Cyclic Loading of Human Articular Cartilage: The Transition from Compaction to Fatigue, *Journal of the Mechanical Behavior of Biomedical Materials*, 65(0):734–742, 2017.

23. Maier, F.S., H. Drissi, D.M. Pierce, Shear Deformations of Human Articular Cartilage: Certain Mechanical Anisotropies Apparent at Large But Not Small Shear Strains, *Journal of the Mechanical Behavior of Biomedical Materials*, 65(0):53–65, 2017.

22. Pierce, D.M., M.J. Unterberger, W. Trobin, T. Ricken, G.A. Holzapfel, A Microstructurally Based Continuum Model of Cartilage Viscoelasticity and Permeability Incorporating Measured Statistical Fiber Orientations, *Biomechanics and Modeling in Mechanobiology*, 15(1):229–244, 2016.

21. Pierce, D.M., T.E. Fastl, B. Rodriguez-Vila, P. Verbrugghe, I. Fourneau, G. Maleux, P. Herijgers, E.J. Gómez, G.A. Holzapfel, A Method for Incorporating Residual Stretches/Stresses into Patient-Specific Simulations of Arteries, *Journal of the Mechanical Behavior of Biomedical Materials*, 47(0):147–164, 2015.

20. Pierce, D.M., F.S. Maier, H. Weisbecker, C. Viertler, P. Verbrugghe, N. Famaey, I. Fourneau, P. Herijgers, G.A. Holzapfel, Human Thoracic and Abdominal Aortic Aneurysmal Tissues: Damage Experiments, Statistical Analysis and Constitutive Modeling, *Journal of the Mechanical Behavior of Biomedical Materials*, 41(0):92–107, 2015.

19. Weisbecker, H., D.M. Pierce, G.A. Holzapfel, A Generalized Prestressing Algorithm for Finite Element Simulation of Pre-Loaded Geometries with Application to the Aorta, *International Journal for Numerical Methods in Biomedical Engineering*, 30(9):857–872, 2014.

18. Tarjuelo-Gutierrez, J., B. Rodriguez-Vila, D.M. Pierce, T.E. Fastl, P. Verbrugghe, I. Fourneau, G. Maleux, P. Herijgers, G.A. Holzapfel, E.J. Gómez, High-Quality Conforming Hexahedral Meshes of Patient-Specific Abdominal Aortic Aneurysms Including Their Intraluminal Thrombi, *Medical & Biological Engineering & Computing*, 52(2):159–168, 2014.

17. Weisbecker, H., C. Viertler, D.M. Pierce, G.A. Holzapfel, The Role of Elastin and Collagen in the Softening Behavior of the Human Aortic Media, *Journal of Biomechanics*, 46(11):1859–1865, 2013.

16. Pierce, D.M., T. Ricken, G.A. Holzapfel, Modeling Sample/Patient-Specific Structural and Diffusional Responses of Cartilage Using DT-MRI, *International Journal for Numerical Methods in Biomedical Engineering*, 29(8):807–821, 2013.

15. Pierce, D.M., T. Ricken, G.A. Holzapfel, A Hyperelastic Biphasic Fiber-Reinforced Model of Articular Cartilage Considering Distributed Collagen Fiber Orientations: Continuum Basis, Computational Aspects and Applications, *Computer Methods in Biomechanics and Biomedical Engineering*, 16(12):1344–1361, 2013.

14. Schriefl, A.J., A. Reinisch, S. Sankaran, D.M. Pierce, G.A. Holzapfel, Quantitative Assessment of Collagen Fiber Orientations from 2D Images of Soft Biological Tissues, *Journal of the Royal Society Interface*, 9(76):3081–3093, 2012.

13. Schriefl, A.J., M.J. Collins, D.M. Pierce, G.A. Holzapfel, L.E. Niklason, J.D. Humphrey, Remodeling of Intramural Thrombus and Collagen in an Ang-II Infusion ApoE-/- Model of Dissecting Aortic Aneurysms, *Thrombosis Research*, 130(3):e139–e146, 2012.

12. Weisbecker, H., D.M. Pierce, P. Regitnig, G.A. Holzapfel, Layer-Specific Damage Experiments and Modeling of Human Thoracic and Abdominal Aortas with Non-Atherosclerotic Intimal Thickening, *Journal of the Mechanical Behavior of Biomedical Materials*, 12(0):93–106, 2012.

11. Schriefl, A.J., G. Zeindlinger, D.M. Pierce, P. Regitnig, G.A. Holzapfel, Determination of the Layer-Specific Distributed Collagen Fiber Orientations in Human Thoracic and Abdominal Aortas and Common Iliac Arteries, *Journal of the Royal Society Interface*, 9(71):1275–1286, 2012.

10. Pierce, D.M., B. Zeyen, B.M. Huigens, A.M. Fitzgerald, Predicting the Failure Probability of Device Features in MEMS, *IEEE Transactions on Device and Materials Reliability*, 11(3):433–441, 2011.

9. Lilledahl, M.B., D.M. Pierce, T. Ricken, G.A. Holzapfel, C. de Lange Davies, Structural Analysis of Articular Cartilage Using Multiphoton Microscopy: Input for Biomechanical Modeling, *IEEE Transactions on Medical Imaging*, 30(9):1635–1648, 2011.

8. Pierce, D.M., W. Trobin, J. Raya, S. Trattnig, H. Bischof, C. Glaser, G.A. Holzapfel, DT-MRI Based Computation of Collagen Fiber Deformation in Human Articular Cartilage: A Feasibility Study, *Annals of Biomedical Engineering*, 38(7):2447–2463, 2010.

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6. Pierce, D.M., W. Trobin, S. Trattnig, H. Bischof, G.A. Holzapfel, A Phenomenological Approach Toward Sample-Specific Computational Modeling for Articular Cartilage Including Collagen Fiber Tracking, *ASME Journal of Biomechanical Engineering*, 131:091006 (12 pages), 2009.

5. Fitzgerald, A.M., D.M. Pierce, B.M. Huigens, C.D. White, A General Methodology to Predict the Reliability of Single Crystal Silicon MEMS Devices, *IEEE/ASME Journal of Microelectromechanical Systems*, 18(4):962–970, 2009.

4. Pierce, D.M., S.D. Sheppard, P.T. Vianco, A General Methodology to Predict Fatigue Life in Lead-Free Solder Alloy Interconnects, *ASME Journal of Electronic Packaging*, 131:011008 (11 pages), 2009.

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Conference Proceedings & Other Papers

69. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, A Chemo-Mechano-Biological Framework for Evolving Cartilage: Predicting Heterogeneous Degeneration Using 3-D Biphasic Finite Elements, *Proceedings of the 2025 Summer Bioengineering Conference (SBC)*, Santa Ana Pueblo, New Mexico, USA, June 22–25, 2025.

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67. Feng, B., A. Shokrani, A. Seck, D.M. Pierce, Visceral Pain from Colon and Rectum: The Mechanotransduction and Biomechanics, *ASME International Mechanical Engineering Congress & Exposition (IMECE)*, Portland, OR, USA, November 17–21, 2024.

66. Safari, K., A. Almasi, P. Szarek, D.M. Pierce, Low-Energy Impact Induced Damage in Cartilage: A Multiscale Modeling Study Using FE2M, *Proceedings of the 2024 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C)*, Lake Geneva, WI, USA, June 11–14, 2024.

65. Almasi, A., T. Ricken, D.M. Pierce, Finite Elements of Multiscale Mixtures (FE2M): Theory, Numerical Implementation, and Analyses of Size Effects, *Proceedings of the Proceedings of the 2023 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C)*, Vail, CO, USA, June 4–8, 2023.

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Invited Talks and Presentations

Oral Presentations

167. Pierce, D.M., Virtual Cartilage: Toward A Chemo-Mechano-Biological Digital Twin, Musculoskeletal Diseases (MSKD) Research Community Gathering, Luoto Restaurant, Aallonmurtaja, Kuopio, FI, October, 2025.

166. Szarek, P., D.M. Pierce, Computational Modeling of Type II Collagen Mechanics: Linking Fibril Behavior to Tissue-Level Responses, 18^{th} U.S. National Congress on Computational Mechanics, Chicago, IL, USA, July 20–24, 2025.

165. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, A Chemo-Mechano-Biological Framework for Evolving Cartilage: Predicting Heterogeneous Degeneration Using 3-D Biphasic Finite Elements, Summer Bioengineering Conference (SBC), Santa Ana Pueblo, New Mexico, USA, June 22–25, 2025.

164. Gallagher, K.M., S.E. Schneider, D.M. Pierce, C.P. Neu, Low-Energy Impact Loading Induces DNA Damage and Inflammatory Responses in Cartilage Explants, Summer Bioengineering Conference (SBC), Santa Ana Pueblo, New Mexico, USA, June 22–25, 2025.

163. Pierce, D.M., Virtual Cartilage: Toward A Chemo-Mechano-Biological Digital Twin, ME Seminar Series, Department of Mechanical Engineering, University of Utah, Salt Lake City, UT, USA, May, 2025.

162. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, Chemo-Mechano-Biological Modeling of Evolving Cartilage: Theory and Application, British Orthopaedic Research Society Meeting (BORS) Sheffield, UK, September 9–10, 2024.

161. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, A Chemo-Mechano-Biological Framework for Evolving Cartilage: Predicting Degeneration Using 3-D Biphasic Finite Elements, 19^{th} International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Vancouver, CA, USA, July 30–August 1, 2024.

160. Shokrani, A., A. Almasi, B. Feng, D.M. Pierce, Understanding Mechanotransduction Within the Distal Colon and Rectum by Multiscale & Multimodal Computational Models, 16^{th} World Congress on Computational Mechanics (WCCM) and 4^{th} Pan American Congress on Computational Mechanics (PANACM), Vancouver, CA, USA, July 21–26, 2024.

159. Safari, K., A. Almasi, P. Szarek, D.M. Pierce, Low-Energy Impact Induced Damage in Cartilage: A Multiscale Modeling Study Using FE2M, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Lake Geneva, WI, USA, June 11–14, 2024.

158. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, Department of Mechanical & Industrial Engineering, Montana State University, Bozeman, MT, USA, February, 2024.

157. Szarek, P., D.M. Pierce, Inverse Micromechanical Analysis of Networked Type II Collagen Fibers in Articular Cartilage, Microstructural Mechanics meeting within the DGM expert committee Modelling, Simulation, and Data, Berlin, DE, November 15, 2023.

156. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, A Coupled Chemo-Mechano-Biological Framework for Evolving Cartilage Implemented in 3-D, Nonlinear Finite Elements, Society of Engineering Science Annual Technical Meeting (SES), Minneapolis, MN, USA, October 8–11, 2023.

155. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, A Coupled Chemo-Mechano-Biological Model of Cartilage in 3-D Nonlinear Finite Elements using FEBio, 17^{th} U.S. National Congress on Computational Mechanics (USNCCM17), Albuquerque, NM, USA, July 23–27, 2023.

154. Almasi, A., T. Ricken, D.M. Pierce, Finite Elements of Multiscale Mixtures (FE2M): Theory, Numerical Implementation, and Analyses of Size Effects, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, USA, June 4–8, 2023.

153. Szarek, P., D.M. Pierce, A Validated, Data-Driven Constitutive Model of Type II Collagen Including Failure, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, USA, June 4–8, 2023.

152. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, A Chemo-Mechano-Biological Model of Cartilage in FEBio: Studies of Pathological Loading, Homeostatic Adaptation and Bio-Chemical Treatments, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, USA, June 4–8, 2023.

151. Almasi, A., P. Szarek, T. Ricken, D.M. Pierce, Finite Elements of Multiscale Mixtures (FE2M): Applications to Soft Tissues, 18^{th} International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE 2023), Paris, FR, May 3–5, 2023.

150. Rahman. M.M., P.N. Watton, C.P. Neu, D.M. Pierce, Coupled Chemo-Mechano-Biological Simulations of Evolving Osteoarthritis: Theory and 3-D Simulations, 18^{th} International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE 2023), Paris, FR, May 3–5, 2023.

149. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, NYU's Biomedical Engineering Colloquium, New York University, New York, NY, USA, April, 2023.

148. Almasi, A., P. Szarek, T. Ricken, D.M. Pierce, Finite Elements of Multiscale Mixtures (FE2M) Applied to the Mechanics of Cartilage, Society of Engineering Science Annual Technical Meeting (SES 2022), College Station, TX, USA, October 16–19, 2022.

147. Almasi, A., T. Ricken, P. Szarek, D.M. Pierce, Applying 3-D Computational Homogenization to Model Collagen Microdamage in Cartilage, 15^{th} World Congress on Computational Mechanics (WCCM XV) and the 8^{th} Asian Pacific Congress on Computational Mechanics (APCOM 2022), Yokohama, JP, July 31–August 5, 2022.

146. Rahman, M.M., P.N. Watton, T.S.E. Öst, C.P. Neu, D.M. Pierce, A Novel Chemo-Mechano-Biological Model of Osteoarthritic Cartilage, 15^{th} World Congress on Computational Mechanics (WCCM XV) and the 8^{th} Asian Pacific Congress on Computational Mechanics (APCOM 2022), Yokohama, JP, July 31–August 5, 2022.

145. Zhao, Y., B. Feng, D.M. Pierce, Predicting the Micromechanics of Nerve Fibers Embedded in the Distal Colon and Rectum, 9^{th} World Congress of Biomechanics (WCB), Taipei, TH, July 10–14, 2022.

144. Rahman, M.M., P.N. Watton, T.S.E. Öst, C.P. Neu, D.M. Pierce, A Novel Chemo-Mechano-Biological Model of Cartilage with Progressing Osteoarthritis, 9^{th} World Congress of Biomechanics (WCB), Taipei, TH, July 10–14, 2022.

143. Pierce, D.M., Chemo-Mechano-Biological Simulations of Evolving Osteoarthritis, International Symposium on Biomechanics: Challenges of the Next Decade (ISBio 2022), Graz, AT, June 30–July 1, 2022.

142. Wang, X., D.M. Pierce, Parameters to Model Cartilage as Osteoarthritis Progresses, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Eastern Shore, MD, USA, June 20–23, 2022.

141. Rahman, M.M., P.N. Watton, T.S.E. Öst, C.P. Neu, D.M. Pierce, A Chemo-Mechano-Biological Model of Evolving Osteoarthritis, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Eastern Shore, MD, USA, June 20–23, 2022.

140. Rahman, M.M., T.S.E. Öst, C.P. Neu, D.M. Pierce, Towards Predicting the Progression of Osteoarthritis within a Framework of Volumetric Growth and Remodeling, 16^{th} U.S. National Congress on Computational Mechanics, virtual–Chime Live, July 25–29, 2021.

139. Almasi, A., T. Ricken, D.M. Pierce, A 3-D Computational Homogenization Scheme for Multi-Scale Simulations of Fluid Saturated Porous Media, 16^{th} U.S. National Congress on Computational Mechanics, virtual–Chime Live, July 25–29, 2021.

138. Gandhi, V., R. Dresner, D.M. Pierce, N. Janakiraman, M. Upadhyay, Where is the Center of Resistance of Maxillary Dental Arch?: A 3-Dimensional Finite Element Analysis, The 99^{th} General Session of the IADR, the 50th Meeting of the AADR and the 45^{th} Meeting of the CADR (IADR/AADR/CADR), Boston, MA, USA, July 21–24, 2021.

137. Almasi, A., T. Ricken, D.M. Pierce, A Two-Scale Homogenization Scheme for Saturated Porous Media in Three Dimensions, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 14–18, 2021.

136. Rahman, M.M., T.S.E. Öst, C.P. Neu, D.M. Pierce, A Volumetric Growth and Remodeling Framework Towards Predicting the Progression of Osteoarthritis in Articular Cartilage, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 14–18, 2021.

135. Santos, S., C.P. Neu, B. Samolyk, D.M. Pierce, Manipulating the Initiation and Propagation of Microcracks in Collagen Networks of Cartilage, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 14–18, 2021.

134. Szarek, P., D.M. Pierce, Mechanical Testing of Type II Collagen Networks: Towards Modulating Mechanics, Identifying Single-Fiber Properties, and Establishing Multiscale Models, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 14–18, 2021.

133. Wang, X., D.M. Pierce, The Evolution of Heterogeneous Parameters for Modeling Cartilage During the Progression of Osteoarthritis, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 14–18, 2021.

132. Zhao, Y., B. Feng, D.M. Pierce, A Novel Three-Layered Model of Mouse Distal Colon and Rectum Capturing Through-Thickness Biomechanics, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 14–18, 2021.

131. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, ECU Engineering Seminar Series, East Carolina University, Greenville, NC, USA, (virtual–video conference), April, 2021.

130. Egli, F.S., T. Ricken, D.M. Pierce, Towards Consideration of Osteoarthritis in Articular Cartilage by Numerical Modeling of a Hyperelastic Biphasic Fiber Reinforced Model, 91th Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM 2020/2021), Kassel, DE, March 15–19, 2021.

129. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, AME Seminar Series, University of Notre Dame, Notre Dame, IN, USA, (virtual–video conference), February, 2021.

128. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, BME Seminar Series, University of Connecticut, Storrs, CT, USA, (virtual–video conference), February, 2021.

127. Zhao, Y., S. Siri, B. Feng, D.M. Pierce, A Computational Model of Mouse Distal Colon and Rectum Capturing Through-Thickness and Longitudinal Heterogeneities in Biomechanics, 14^{th} World Congress on Computational Mechanics (WCCM XIV) and the $8th$ European Congress on Computational Methods in Applied Sciences and Engineering (ECOMAS 2020), July 19–24, 2020, Paris, FR (Rescheduled virtually, January 11–15, 2021.

126. Wang, X., R.K. June, D.M. Pierce, A 3-D Constitutive Model of Agarose with a Range of Gel Concentrations Facilitates Finite Element Analyses Aimed at Mechanobiology, The Virtual Technical Meeting of the Society of Engineering Science (SES), virtual–Zoom video conference, September 29–October 1, 2020.

125. Marshall, L., A. Tarakanova, P. Szarek, D.M. Pierce, Regarding the Temperature-Dependent Mechanics of Cartilage and Collagen Under Large-Strain Shear, The Virtual Technical Meeting of the Society of Engineering Science (SES), virtual–Zoom video conference, September 29–October 1, 2020.

124. Pierce, D.M., Experiments Toward Virtual Cartilage: A Framework for Health and Disease, Barocas Research Group, University of Minnesota, Minneapolis, MN (virtual–video conference), August, 2020.

123. Marshall, L., A. Tarakanova, P. Szarek, D.M. Pierce, Regarding the Temperature-Dependent Mechanics of Cartilage and Collagen Under Large-Strain Shear, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 17–20, 2020.

122. Rahman, M.M., T.S.E. Öst, C.P. Neu, D.M. Pierce, Modeling Chondrocyte Death Cause by Microscale Strain in Cartilage, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 17–20, 2020.

121. Szarek, P.E., M.B. Lilledahl, C.G. Lewis, D.M. Pierce, Evolution of the Collagen Network of Human Cartilage During Progression of Osteoarthritis: Implications for Potential Biomarkers, Intra-Tissue Mechanics, and Mechanical Modeling, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 17–20, 2020.

120. Wang, X., R.K. June, D.M. Pierce, A 3-D Constitutive Model for Finite Element Analyses of Agarose with a Range of Gel Concentrations, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 17–20, 2020.

119. Zhao, Y., S. Siri, B. Feng, D.M. Pierce, A Computational Model of Mouse Distal Colon and Rectum Capturing Through-Thickness and Longitudinal Heterogeneities in Biomechanics, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 17–20, 2020.

118. Schneider, S.E., B. Seelbinder, R.L. Wilson, D.M. Pierce, C.P. Neu, Single High Impulse on Neural Cultures Results in Divergent Biophysical Nuclear Responses, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 17–20, 2020.

117. Wilson, R.L., N.C. Emery, D.M. Pierce, C.P. Neu, Anatomically Relevant Spatial Gradients Improve the Early Detection and Prediction of Osteoarthritis: Data from Human Explants and the Osteoarthritis Initiative, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 17–20, 2020.

116. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, Department of Mechanical & Industrial Engineering, Montana State University, Bozeman, MT, USA, February, 2020.

115. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, Biomedical Engineering Seminar, Ecole Polytechnique, Palaiseau, FR, November, 2019.

114. Siri, S., F. Maier, S. Santos, D.M. Pierce, B. Feng, Multiscale Colorectal Biomechanics and Implications in Visceral Nociception, ASME International Mechanical Engineering Congress & Exposition (IMECE), Salt Lake City, UT, USA, November 11–14, 2019.

113. Siri, S., F. Maier, D.M. Pierce, B. Feng, Determining the Biomechanics of Layer-Separated Mouse Colorectum Using Biaxial Tensile Stretch, Biomedical Engineering Society Annual Meeting (BMES), Philadelphia, PA, USA, October 16–19, 2019.

112. Feng, B., S. Siri, F. Maier, D.M. Pierce, Quantifying the Collagen-Network Morphology in Mouse Distal Colon and Rectum, Biomedical Engineering Society Annual Meeting (BMES), Philadelphia, PA, USA, October 16–19, 2019.

111. Schneider, S.E., B. Seelbinder, S. Ghosh, R. Wilson, D.M. Pierce, C.P. Neu, High-Impulse Strain to Neural Cells Decreases Intranuclear Motion and Increases Chromatin Condensation, Biomedical Engineering Society Annual Meeting (BMES), Philadelphia, PA, USA, October 16–19, 2019.

110. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, Department of Mechanical and Aerospace Engineering, University of Central Florida, Orlando, FL, USA, October, 2019.

109. Egli, F., T. Ricken, X. Wang, D.M. Pierce, A Hyperelastic Biphasic Fiber Reinforced Model of Articular Cartilage Incorporating the Influences of Osmotic Pressure and Damage, 7^{th} International Conference on Structural Engineering, Mechanics and Computation (SEMC), Cape Town, ZA, September 2–4, 2019.

108. Pierce, D.M., S. Santos, F. Maier, J.T. Kaplan, B. Kaleem, C.P. Neu, Keynote–Initiation and Propagation of Microcracks in Collagen Networks of Articular Cartilage, 16^{th} International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE) and the 4^{th} Conference on Imaging and Visualization, New York, NY, USA, August 14–16, 2019.

107. Pierce, D.M., T. Ricken, X. Wang, T.S.E. Öst, M. Lilledahl, C.P. Neu, Invited–Image-Based Constitutive Modeling of Articular Cartilage, 16^{th} International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE) and the 4^{th} Conference on Imaging and Visualization, New York, NY, USA, August 14–16, 2019.

106. Zhao, Y., B. Feng, J. Lee, N. Lu, D.M. Pierce, A Multi-Layered Model of Human Skin Reveals Mechanisms of Wrinkling in the Forehead, 15^{th} US National Congress on Computational Mechanics (USNCCM15), Austin, TX, USA, July 28–August 1, 2019.

105. Strbac, V., B. Rodriguez-Vila, D.M. Pierce, Regarding the In Vivo Relevance of Impact Tests on Unconfined Cylindrical Plugs of Cartilage, 15^{th} US National Congress on Computational Mechanics (USNCCM15), Austin, TX, USA, July 28–August 1, 2019.

104. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, Institute of Healthcare Engineering, University College London, London, UK, June, 2019

103. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, Insigneo Institute for in Silico Medicine, University of Sheffield, Sheffield, UK, June, 2019.

102. Szarek, P.E., M.B. Lilledahl, C.G. Lewis, D.M. Pierce, Toward Quantifying Changes in the Collagen Network of Human Articular Cartilage During Early-Stage Osteoarthritis, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Seven Springs, PA, USA, June 25–28, 2019.

101. Maier, F., C.G. Lewis, D.M. Pierce, Through-Thickness Patterns of Shear Strain Change with Early-Stage Progression of Osteoarthritis, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Seven Springs, PA, USA, June 25–28, 2019.

100. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, The University of Pittsburgh, Pittsburgh, PA, USA, June, 2019.

99. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, The University of California – Riverside, Riverside, CA, USA, June, 2019.

98. Pierce, D.M., Virtual Cartilage: Toward Translational Applications, The University of Vermont, Burlington, VT, USA, April, 2019.

97. Santos, S., N. Emery, C.P. Neu, D.M. Pierce, Microcrack Initiation and Propagation in Articular Cartilage, Biomedical Engineering Society Annual Meeting (BMES), Atlanta, GA, USA, October 17–20, 2018.

96. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, Osteo-Articular Bioengineering and Bioimaging (B2OA), University Paris Diderot, Sorbonne Paris Cité, Paris, FR, August, 2018.

95. Wang, X., T.S.E. Eriksson, T. Ricken, D.M. Pierce, A Practical Finite Element Method to Include Osmotically Induced Prestretch/ Prestress in Image-Driven Simulations of Cartilage, 13^{th} World Congress on Computational Mechanics (WCCM)/2^{nd} Pan American Congress on Computational Mechanics (PANACM), New York, NY, USA, July 22–27, 2018.

94. Pierce, D.M., F. Maier, B. Rodriguez-Vila, T.S.E. Eriksson, T. Ricken, C.G. Lewis, Biomechanical Simulations of Progressing Osteoarthritis: Experiments, Theory, Finite Elements, and Preliminary Results, 8^{th} World Congress of Biomechanics (WCB)/Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Dublin, IR, July 8–12, 2018.

93. Santos, S., N. Emery, C.P. Neu, D.M. Pierce, Microcrack Initiation and Propagation in Articular Cartilage, 2018 Conference of Ford Fellows, National Academy of Sciences, Washington, DC, USA, May 4, 2018.

92. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, School of Mathematics and School of Materials, University of Manchester, Manchester, UK, May, 2018.

91. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, School of Mathematical Sciences, University of Nottingham, Nottingham, UK, May, 2018.

90. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, Insigneo Institute for in Silico Medicine, University of Sheffield, Sheffield, UK, May, 2018.

89. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, MAE Seminar Series, Department of Mechanical & Aerospace Engineering, University of Florida, Gainesville, FL, USA, April, 2018.

88. Pierce, D.M., T. Ricken, G.A. Holzapfel, CMBBE Journal Best Paper 2013: A Hyperelastic Biphasic Fibre-Reinforced Model of Articular Cartilage Considering Distributed Collagen Fibre Orientations: Continuum Basis, Computational Aspects and Applications, 15^{th} International Symposium on Computer Methods in Biomechanics and Biomedical Engineering and the 3^{rd} Conference on Imaging and Visualization, Lisbon, PT, March 26–29, 2018.

87. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, Departmental Seminar Series, Department of Biomedical Engineering, University of Arizona, Tucson, AZ, USA, February, 2018.

86. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, MechSE Seminar Series, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, USA, November, 2017.

85. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, Biomedical Engineering Seminar Series, Department of Biomedical Engineering, Rensselaer Polytechnic Institute, Troy, NY, USA, November, 2017.

84. Maier, F., C.G. Lewis, D.M. Pierce, Through-Thickness Patterns of Shear Strain Change with Progressively Osteoarthritic Human Cartilage, Biomedical Engineering Society Annual Meeting (BMES), Phoenix, AZ, USA, October 11–14, 2017.

83. Pierce, D.M., Toward Virtual Cartilage: An Analysis Framework for Health and Disease, BME Seminar Series, Weldon School of Biomedical Engineering, Purdue University, West Lafayette, IN, USA, August, 2017.

82. Zhang, Y., K. Abiraman, H. Li, D.M. Pierce, A.V. Tzingounis, G. Lykotrafitis, Modeling of the Axon Plasma Membrane Including The Membrane Skeleton and the Lipid Bilayer, 54^{th} Annual Technical Meeting of the Society of Engineering Science (SES), Boston, MA, USA, July 25–28, 2017.

81. Maier, F., C.G. Lewis, D.M. Pierce, The Evolving Large Shear Strain Responses of Progressively Osteoarthritic Human Cartilage, 54^{th} Annual Technical Meeting of the Society of Engineering Science (SES), Boston, MA, USA, July 25–28, 2017.

80. Pierce, D.M., Toward Virtual Cartilage: Recent Results in Mechanical Testing and an Open Challenge, Biomomentum, Montréal, QC, Canada, July, 2017.

79. Rodriguez-Vila, B., D.M. Pierce, Methodology for Generating Hexahedral Finite Element Meshes of Patient-Specific Cartilage Using Image Data from the Osteoarthritis Initiative, 14^{th} US National Congress on Computational Mechanics (USNCCM14), Montréal, QC, CA, July 17–20, 2017.

78. Rodriguez-Vila, B., D.M. Pierce, Fully Automated, Hexahedral Meshing of Patient-Specific Cartilage Structures: Data from the Osteoarthritis Initiative, 2017 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Tucson, AZ, USA, June 21–24, 2017.

77. Pierce, D.M., Toward Virtual Cartilage: Structure-Function in Health and Disease, Center for Advanced Orthopaedic Studies (CAOS), Beth Israel Deaconess Medical Center/Harvard Medical School, Boston, MA, USA, May, 2017.

76. Pierce, D.M., Toward Virtual Cartilage: Structure-Function in Health and Disease, BMES Club @ UB presents, "1 Concept 2 Creation," University of Bridgeport, Bridgeport, CT, USA, April, 2017.

75. Pierce, D.M., Towards Virtual Cartilage and Other Life Philosophies, STEM Seminar Series for Undergraduates, University of Connecticut, Storrs, CT, USA, March, 2017.

74. Pierce, D.M., Toward Virtual Cartilage: Structure-Function in Health and Disease, "Grand Rounds," Department of Kinesiology, University of Connecticut, Storrs, CT, USA, March, 2017.

73. Santos, S.F., F. Maier, D.M. Pierce, Anisotropy and Heterogeneity of Bovine Articular Cartilage Under Large-Strain Shearing, 53^{rd} Annual Technical Meeting of the Society of Engineering Science (SES), College Park, MD, USA, October 4–7, 2016.

72. Pierce, D.M., Steps Toward an Interdisciplinary Analysis Framework for Cartilage, Samsung Advanced Institute for Health Sciences and Technology, Sungkyunkwan University (SKKU), Suwon, KR, July, 2016.

71. Kaplan, J.T., H. Drissi, C.P. Neu, D.M. Pierce, Effects of Load Magnitude and Frequency on the Transition from Compaction to Fatigue in Articular Cartilage, 12^{th} World Congress on Computational Mechanics (WCCM) and 6^{th} Asia-Pacific Congress on Computational Mechanics (APCOM), Seoul, KR, July 24–29, 2016.

70. Argote, P.F., A. Poon, X. Xu, J.T. Kaplan, D.M. Pierce, C.P. Neu, Image-Based Modeling to Assess the Role of Impact Loading in Cartilage Damage and Chondrocyte Viability, 12^{th} World Congress on Computational Mechanics (WCCM) and 6^{th} Asia-Pacific Congress on Computational Mechanics (APCOM), Seoul, KR, July 24–29, 2016.

69. Pierce, D.M., Toward Virtual Cartilage: Experiments, Formulations and Examples, CKD Research Institute, Gyeonggi-do, KR, July, 2016.

68. Pierce, D.M., Toward Virtual Cartilage: An Interdisciplinary Analysis Framework, Korea University, Sejong, KR, July, 2016.

67. Pierce, D.M., Toward an Interdisciplinary Analysis Framework for Cartilage: Experiments, Formulations and Examples, Korea Institute of Science and Technology (KIST), Seoul, KR, July, 2016.

66. Maier, F., H. Drissi, D.M. Pierce, Shear Testing of Human Articular Cartilage: Anisotropy Apparent at Large but not Small Shear Strains, 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), National Harbor, MD, USA, June 29–July 2, 2016.

65. Pierce, D.M., The Importance of Experimental and Computational Biomechanics on Diagnoses and Therapies for Cartilage, University of Eastern Finland, Kuopio, FI, February, 2016.

64. Pierce, D.M., Toward an Interdisciplinary Analysis Framework for Cartilage: Formulations, Experiments and Examples, Biophysics of Bone and Cartilage (BBC), University of Eastern Finland, Kuopio, FI, February, 2016.

63. Pierce, D.M., Toward an Interdisciplinary Analysis Framework for Cartilage: Formulations and Examples, Applied Mechanics Symposium 2015, University of Connecticut, Storrs, CT, USA, November 20, 2015.

62. Pierce, D.M., Toward an Interdisciplinary Analysis Framework for Cartilage: Formulations and Examples, Department Seminar, Department of Mechanical and Industrial Engineering, Northeastern University, Boston, MA, USA, October, 2015.

61. Štrbac, V., D.M. Pierce, J. Vander Sloten, N. Famaey, GPU-Based Fast Finite Element Solution for Nonlinear Anisotropic Material Behavior and Comparison of Integration Strategies, Computational Biomechanics for Medicine X (CBM X) MICCAI 2015 Workshop, Munich, DE, October 5, 2015.

60. Pierce, D.M., Improving Patient-Specific Finite Element Simulations of Human Arteries: Aspects on Meshes, Prestresses and Residual Stresses, Department of Biomedical Engineering, Yale University, New Haven, CT, USA, August, 2015.

59. Štrbac, V., N. Famaey, J. Vander Sloten, D.M. Pierce, Custom Finite Element Simulations Using GPGPU Technology: Towards Faster Patient-Specific Predictions, 13^{th} US National Congress on Computational Mechanics (USNCCM13), July 26–30, San Diego, CA, USA, 2015.

58. Eriksson, T.S.E., D.M. Pierce, A 3-D Volumetric Growth and Remodeling Framework for Osteoarthritic Cartilage: Theory, Implementation in Finite Elements and Preliminary Results, 9^{th} European Solid Mechanics Conference (ESMC 2015), Madrid, ES, July 6–10, 2015.

57. Pierce, D.M., Improving Patient-Specific Finite Element Simulations of Human Arteries: Aspects on Meshes, Prestresses and Residual Stresses, Biomedical Engineering and Telemedicine Centre, Universidad Politécnica de Madrid, Madrid, ES, July, 2015.

56. Pierce, D.M., Toward an Interdisciplinary Analysis Framework for Cartilage: Formulations, Experiments and Examples, Musculoskeletal Research Laboratories (MRL), University of Utah, Salt Lake City, UT, USA, June, 2015.

55. Ricken, T., D.M. Pierce, A Biphasic Fiber-Reinforced FE Model for Cartilage: Continuum Basis, Computational Aspects and Applications, Engineering Mechanics Institute (EMI) Conference 2015, Stanford, CA, USA, June 16–19 2015.

54. Pierce, D.M., Toward an Interdisciplinary Analysis Framework for Cartilage: Formulations, Experiments and Examples, Mechanical Engineering Seminar Series, Columbia University, New York, NY, USA, September, 2014.

53. Pierce, D.M., Toward an Interdisciplinary Analysis Framework for Cartilage: Formulations, Experiments and Examples, Iowa Institute for Biomedical Imaging, University of Iowa, Iowa City, IA, USA, September, 2014.

52. Pierce, D.M., T. Ricken, G.A. Holzapfel, A New Continuum Model of Cartilage Elasticity and Permeability Facilitates Insights on Structure-Function Relationships, 11^{th} World Congress on Computational Mechanics (WCCM XI)/5^{th} European Conference on Computational Mechanics (ECCM V), Barcelona, ES, July 20–25, 2014.

51. Pierce, D.M., F. Maier, H. Weisbecker, C. Viertler, P. Verbrugghe, N. Famaey, I. Fourneau, P. Herijgers, G.A. Holzapfel, Human Thoracic and Abdominal Aortic Aneurysmal Tissues: Damage Experiments, Analysis and Modeling, 7^{th} World Congress of Biomechanics (WCB)/ASME 2014 Summer Bioengineering Conference (SBC), Boston, MA, USA, July 6–11, 2014.

50. Pierce, D.M., Understanding the Etiology of OA Through Computer Simulation and Biomechanics, New England Musculoskeletal Institute Research Day, Avon, CT, USA, April 4, 2014.

49. Albrecht, D., T. Ricken, D.M. Pierce, A Multi-Component Description of Osmotic Driven Deformations in Articular Cartilage, 85^{th} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Erlangen, DE, March 10–14, 2014.

48. Pierce, D.M., M.J. Unterberger, W. Trobin, T. Ricken, G.A. Holzapfel, A New Continuum Model Incorporating Patient-Specific Statistical Fiber Orientations Provides Insight on Structure-Function Relationships in Cartilage, 2^{nd} USACM Thematic Conference on Multiscale Methods and Validation in Medicine and Biology (MMVMB II), Berkeley, CA, USA, February 13–14, 2014.

47. Tarjuelo-Gutierrez, J., B. Rodriguez-Vila, D.M. Pierce, T. Fastl, E.J. Gómez, Quantitative Evaluation of Patient-Specific Conforming Hexahedral Meshes of Abdominal Aortic Aneurysms and Intraluminal Thrombus Generated from MRI, 13^{th} Mediterranean Conference on Medical and Biological Engineering and Computing (MEDICON), Seville, ES, September 25–28, 2013.

46. Holzapfel, G.A., D.M. Pierce, T.E. Fastl, Incorporating Three-Dimensional Residual Stresses into Patient-Specific Simulations: Examples on Abdominal Aortic Aneurysms, 12^{th} International Conference on Computational Plasticity: Fundamentals and Applications (Complas XII), Barcelona, ES, September 3–5, 2013.

45. Pierce, D.M., M.J. Unterberger, T. Ricken, W. Trobin, G.A. Holzapfel, A Microstructurally-Based Continuum Model of Cartilage Elasticity and Permeability, USACM 12^{th} U.S. National Congress on Computational Mechanics (USNCCM12), Raleigh, NC, USA, July 22–25, 2013.

44. Pierce, D.M., T. Ricken, M.B. Lilledahl, W. Trobin, G.A. Holzapfel, Characterization and Modeling of Articular Cartilage: Mathematical Formulations, Experiments and Numerical Examples, School of Mathematics and Statistics Colloquium, The University of Glasgow, Glasgow, GB, July, 2013.

43. Pierce, D.M., T. Fastl, H. Weisbecker, B. Rodriguez-Vila, J. Tarjuelo-Gutierrez, E.J. Gómez, G.A. Holzapfel, Improving Patient-Specific Finite Element Simulations of Human Arteries: Aspects on Meshes, Prestresses and Residual Stresses, Mathematical Biology Seminar, The University of Glasgow, Glasgow, GB, July, 2013.

42. Pierce, D.M., The Impact of Experimental and Computational Biomechanics on Diagnosis and Therapy, Habilitation Colloquium for Venia Docendi, Graz University of Technology, Graz, AT, July, 2013.

41. Pierce, D.M., T.E. Fastl, H. Weisbecker, B. Rodriguez-Vilaz, P. Verbrugghe, I. Fourneau, G. Maleux, P. Herijgers, E.J. Gómez, G.A. Holzapfel, Method for Incorporating Three-Dimensional Residual Stresses into Patient-Specific Simulations of Arteries, ASME 2013 Summer Bioengineering Conference (SBC), Sunriver, OR, USA, June 26–29, 2013.

40. Weisbecker, H., D.M. Pierce, G.A. Holzapfel, An Experimentally-Based Numerical Framework for Damage Modeling of Human Arterial Tissue, 84^{th} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Novi Sad, RS, March 18–22, 2013.

39. Albrecht, D., T. Ricken, D.M. Pierce, G.A. Holzapfel, A Hyperelestic Biphasic Fiber Reinforced Model for Articular Cartilage Considering the Distribution and Orientation of Collagen Fibers, 84^{th} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Novi Sad, RS, March 18–22, 2013.

38. Pierce, D.M., T. Ricken, M.B. Lilledahl, W. Trobin, G.A. Holzapfel, Characterization and Modeling of Articular Cartilage: Mathematical Formulations, Experiments and Numerical Examples, The Eindhoven University of Technology, Eindhoven, NL, November, 2012.

37. Sette, M., E.V. Poorten, J. Vander Sloten, A. Dore, B. Rodriguez-Vila, H. Fontenelle, D.M. Pierce, G. Leo, M. Vatteroni, V. Meiser, Smart Catheterization Project, The Virtual Physiological Human Conference (VPH), London, UK, September 18–20, 2012.

36. Pierce, D.M., T.E. Fastl, H. Weisbecker, B. Rodriguez-Vilaz, E.J. Gómez, G.A. Holzapfel, A Method for Incorporating Residual Stresses into Patient-Specific Finite Element Simulations of Arteries with an Example on AAAs, 6^{th} European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS), Vienna, AT, September 10–14, 2012.

35. Pierce, D.M., T. Ricken, G.A. Holzapfel, Biphasic Fiber-Reinforced Modeling of Cartilage with Sample-Specific Distributed Collagen Fiber Orientations, 23^{rd} International Congress on Theoretical and Applied Mechanics (ICTAM), Beijing, CH, August 19–24, 2012.

34. Romijn, E.I., C. de Lange Davies, D.M. Pierce, G.A. Holzapfel, M.B. Lilledahl, 3D Quantitative Structural Analysis of Second Harmonic Generation Images of Cartilage, 8^{th} European Solid Mechanics Conference (ESMC), Graz, AT, July 9–13, 2012.

33. Albrecht, D., T. Ricken, D.M. Pierce, G.A. Holzapfel, A Biphasic Transverse Isotropic FEM Model for Cartilage, 8^{th} European Solid Mechanics Conference (ESMC), Graz, AT, July 9–13, 2012.

32. Pierce, D.M., T. Ricken, G.A. Holzapfel, Predicting the Sample-Specific Structural and Diffusional Response of Cartilage Using DT-MRI, 8^{th} European Solid Mechanics Conference (ESMC), Graz, AT, July 9–13, 2012.

31. Weisbecker, H., D.M. Pierce, G.A. Holzapfel, Layer-specific modeling of damage induced softening in the human aorta and the influence of residual stretches, 8^{th} European Solid Mechanics Conference (ESMC), Graz, AT, July 9–13, 2012.

30. Fastl, T.E., D.M. Pierce, H. Weisbecker, G.A. Holzapfel, A Method for Incorporating Residual Stresses into Finite Element Simulations with an Application to Abdominal Aortic Aneurysms, 8^{th} European Solid Mechanics Conference (ESMC), Graz, Austria, July 9–13, 2012.

29. Weisbecker, H., D.M. Pierce, B. Rodriguez-Vila, E.J. Gómez, G.A. Holzapfel, Patient-Specific Modeling of Stresses and Damage in the Human Thoracic Aorta, SCATh Joint Workshop on New technologies for Computer/Robot Assisted Surgery, Madrid, ES, July 9–10, 2012.

28. Weisbecker, H., D.M. Pierce, G.A. Holzapfel, Damage Modeling for the Human Aorta and the influence of Collagenase and Elastase Treatment, 18^{th} Congress of the European Society of Biomechanics (ESB), Lisbon, PT, July 1–4, 2012.

27. Tarjuelo-Gutiérrez, J., B. Rodriguez-Vila, P. Sánchez-González, D.M. Pierce, G.A. Holzapfel, E.J. Gómez, Automatic Generation of Models for Abdominal Aortic aneurysms and intraluminal thrombus based on hexahedral meshes, Computer Assisted Radiology and Surgery, 26^{th} International Congress and Exhibition (CARS), Pisa, IT, June 27–30, 2012.

26. Pierce, D.M., T. Ricken, M.B. Lilledahl, W. Trobin, G.A. Holzapfel, Characterization and Modeling of Articular Cartilage: Mathematical Formulations, Experiments and Numerical Examples, The University of Connecticut, Storrs, CT, USA, April, 2012.

25. Albrecht, D., T. Ricken, D.M. Pierce, G.A. Holzapfel, A Biphasic Transverse Isotropic FEM Model for Cartilage, 83^{rd} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Darmstadt, DE, March 26–30, 2012.

24. Ricken, T., D.M. Pierce, G.A. Holzapfel, A Biphasic Transverse Isotropic FEM Model for Cartilage, 11^{th} International Conference on Computational Plasticity: Fundamentals and Applications (Complas XI), Barcelona, ES, September 7–9, 2011.

23. Pierce, D.M., H. Weisbecker, A.J. Schriefl, B. Rodriguez-Vila, E.J. Gómez, G.A. Holzapfel, Modeling Arterial Tissue and Intraluminal Thrombus: Experimental and Numerical Results, 2^{nd} International Conference on Material Modelling (ICMM2), 12^{th} European Mechanics of Materials Conference, Paris, FR, August 31–September 2, 2011.

22. Holzapfel, G.A., A.J. Schriefl, A. Reinisch, D.M. Pierce, S. Murtada, M. Böl, J. Stalhand, Advances in the Modeling of Soft Collagenous Tissues: The Role of Distributed Collagen Fiber Orientations and Active Tone in Arteries, International Union of Theoretical and Applied Mechanics IUTAM Symposium on Computer Models in Biomechanics: from Nano to Macro, Stanford, CA, USA, August 29–September 2, 2011.

21. Pierce, D.M., T. Ricken, G.A. Holzapfel, A Hyperelastic Biphasic Fiber-Reinforced Model of Cartilage: Formulation, Numerical Examples and Applications, USACM 11^{th} U.S. National Congress on Computational Mechanics (USNCCM11), Minneapolis, MN, USA, July 25–28, 2011.
20. Schriefl, A.J., P. Regitnig, D.M. Pierce, G.A. Holzapfel, Experimental Quantification of the Layer-Specific Distribution of Collagen Fiber Orientations in Human Descending Aorta and Common Iliac Arteries, SCATh Joint Workshop on New technologies for Computer/Robot Assisted Surgery, Graz, AT, July 11–13, 2011.
19. Weisbecker, H., D.M. Pierce, G.A. Holzapfel, Modeling of Damage-Induced Softening for Arterial Tissues, SCATh Joint Workshop on New technologies for Computer/Robot Assisted Surgery, Graz, AT, July 11–13, 2011.
18. Schriefl, A.J., P. Regitnig, D.M. Pierce, G.A. Holzapfel, Layer-specific Distributed Collagen Fiber Orientations in Human Arteries from Thoracic Aorta to Common Iliac, ASME 2011 Summer Bioengineering Conference (SBC), Farmington, PA, USA, June 22–25, 2011.
17. Pierce, D.M., T. Ricken, M.B. Lilledahl, W. Trobin, G.A. Holzapfel, Characterization and Modeling of Articular Cartilage: Formulations and Numerical Examples, The University of Vermont, Burlington, VT, USA, May, 2011.
16. Pierce, D.M., T. Ricken, G.A. Holzapfel, A Hyperelastic Biphasic Fiber-Reinforced Model of Articular Cartilage: Formulation and Numerical Examples, 82^{nd} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Graz, AT, April 18–22, 2011.
15. Fastl, T.E., D.M. Pierce, G.A. Holzapfel, Revisiting the Mechanical Testing of Human Arterial Tissue Considering Residual Stresses, 82^{nd} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Graz, AT, April 18–22, 2011.
14. Schriefl, A.J., D.M. Pierce, P. Regitnig, G.A. Holzapfel, Experimental Determination of the Distributed Collagen Fiber Orientations in the Human Descending Aorta and Common Iliac Artery, 82^{nd} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Graz, AT, April 18–22, 2011.
13. Weisbecker, H., D.M. Pierce, G.A. Holzapfel, Pseudo-Elastic Modeling of Damage for Healthy Human Aortas with Nonatherosclerotic Intimal Thickening, 82^{nd} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Graz, AT, April 18–22, 2011.
12. Zeindlinger, G., A.J. Schriefl, P. Regitnig, D.M. Pierce, G.A. Holzapfel, A Sample Preparation Method for the Measurement of Distributed Collagen Fiber Orientations in Human Soft Tissues, 82^{nd} Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Graz, AT, April 18–22, 2011.
11. Lilledahl, M.B., D.M. Pierce, T. Ricken, G.A. Holzapfel, C. de Lange Davies, Structural Analysis of Articular Cartilage using Multiphoton Microscopy: Input for Biomechanical Modeling, SPIE Photonics West 2011, San Francisco, CA, USA, January 22–27, 2011.
10. Pierce, D.M., M.B. Lilledahl, C. de Lange Davies, G.A. Holzapfel, Morphological Analysis of Articular Cartilage Using Multiphoton Microscopy as Input for Constitutive Modeling: Experiment and Mathematical Implementation, 6^{th} World Congress of Biomechanics (WCB), Singapore, SG, August 1–6, 2010.
9. Pierce, D.M., W. Trobin, S. Trattnig, H. Bischof, G.A. Holzapfel, DT-MRI Based Numerical Simulation of Collagen Fiber Deformation in Human Articular Cartilage, ASME 2009 Summer Bioengineering Conference (SBC), Lake Tahoe, CA, USA, June 17–21, 2009.
8. Pierce, D.M., W. Trobin, H. Bischof, S. Trattnig, G.A. Holzapfel, Toward Patient-Specific Computational Modeling of Articular Cartilage: An Example incorporating 17.6T DT-MRI, University of Gent, Gent, BE, April, 2009.
7. Pierce, D.M., W. Trobin, H. Bischof, S. Trattnig, G.A. Holzapfel, A Sample-Specific Computational Model of Articular Cartilage based on MRI, Histology, Computer Vision and Mechanical Testing, 8^{th} World Congress on Computational Mechanics (WCCM)/5^{th} European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS), Venice, IT, June 30–July 5, 2008.

6. Fitzgerald, A.M., D.M. Pierce, B.M. Huigens, C.D. White, Fracture Prediction of Single Crystal Silicon MEMS Under Multi-Axial Loading, 2008 Hilton Head Workshop on Sensors and Actuators, Hilton Head Island, SC, USA, June 1–5, 2008.
5. Pierce, D.M., S.D. Sheppard, P.T. Vianco, J.A. Regent, J.M. Grazier, Continuum Damage Mechanics Based Failure Prediction Methodology for Lead-Free Solder Alloy Interconnects in Electronic Packaging, University of Cape Town, Cape Town, ZA, June, 2007.
4. Pierce, D.M., S.D. Sheppard, P.T. Vianco, J.A. Regent, J.M. Grazier, Continuum Damage Mechanics Based Failure Prediction Methodology for 95.5Sn-3.9Ag-0.6Cu Solder Alloy Interconnects in Electronic Packaging, IPC/JEDEC Global Conference on Lead Free Reliability & Reliability Testing for RoHS Lead Free Electronics, Boston, MA, USA, April 10–11, 2007.
3. Pierce, D.M., J.A. Zimmerman, Report on an Inquiry into Tensegrity Structures with Emphasis on Mechanics, Engineering Sciences Summer Institute Seminar, Sandia National Laboratories, Livermore, CA, USA, September, 2002.
2. Pierce, D.M., S.D. Sheppard, FEA Reliability Methodology Investigation of BGA Joints and Packages, Hewlett-Packard Labs, Palo Alto, CA, USA, May, 2002.
1. Coulin, A.D., J.V. Hoften, D.M. Pierce, M.R. Cutkosky, Empirical and Mathematical Study of Adjustable Hospital Bed, Paramount Bed Company Ltd., Stanford, CA, USA, October, 2000.

Poster Presentations

21. Feng, B., A. Shokrani, A. Seck, D.M. Pierce, Visceral Pain from Colon and Rectum: The Mechanotransduction and Biomechanics, ASME International Mechanical Engineering Congress & Exposition (IMECE), Portland, OR, USA, November 17–21, 2024.
20. Shokrani, A., B. Feng, D.M. Pierce, A Multimodal Computational Framework Towards Investigating Mechanotransduction in the Colorectum, 16^{th} World Congress on Computational Mechanics (WCCM) and 4^{th} Pan American Congress on Computational Mechanics (PANACM), Vancouver, CA, July 21–26, 2024.
19. Rahman, M.M., P.N. Watton, C.P. Neu, D.M. Pierce, A Chemo-Mechano-Biological Framework for Simulating Degeneration of Cartilage using 3-D Biphasic Finite Elements, 16^{th} World Congress on Computational Mechanics (WCCM) and 4^{th} Pan American Congress on Computational Mechanics (PANACM), Vancouver, CA, July 21–26, 2024.
18. Shokrani, A., A. Almasi, B. Feng, D.M. Pierce, Understanding Mechanotransduction of Distal Colon and Rectum by Multiscale and Multimodal Computational Modeling, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, USA, June 4–8, 2023.
17. Szarek, P., D.M. Pierce, The Mechanics of Networked, Type II Collagen Fibers from Cartilage, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Eastern Shore, MD, USA, June 20–23, 2022.
16. Almasi, A., T. Ricken, D.M. Pierce, A 3-D Multiscale Homogenization Method for Fluid-Saturated Porous Media: Theory, Computational Implementation, and Examples, 2021 SES (Virtual) Month: Mechanics Matters! (Size Matters), October 1, virtual–Gather.Town, 2021.
15. Feng, B., Y. Zhao, S. Siri, D.M. Pierce, The Biomechanics of Colorectal Submucosa and Its Relevance to Visceral Nociception, Federation of Neurogastroenterology and Motility Meeting 2020, Adelaide, AU, April 14–17, 2021.
14. Egli, F.S., T. Ricken, D.M. Pierce, A Biphasic Fiber Reinforced Model of Articular Cartilage, 91st Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Kassel, DE, March 15–19, 2021.
13. Santos, S., K. Richard, M.C. Fisher, C.N. Dealy, D.M. Pierce, Low-Energy Mechanical Impacts to Articular Cartilage Increase at Least One Anabolic Protein in Chondrocytes, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Seven Springs, PA, USA, June 25–28, 2019.

12. Richard, K., M.C. Fisher, S. Santos, D.M. Pierce, C.N. Dealy, The Impact of Mechanical Load on Regenerative Responses in Knee Articular Cartilage, 22^{nd} Annual Frontiers in Undergraduate Research Poster Exhibition, University of Connecticut, Storrs, CT, USA, April 12–13, 2019.
11. Santos, S., N. Emery, C.P. Neu, D.M. Pierce, Initiation and Propagation of Microcracks in Collagen Networks of Cartilage, 42^{nd} Annual Meeting of the American Society of Biomechanics, Rochester, MN, USA, August 8–11, 2018.
10. Wang, X., T.S.E. Eriksson, T. Ricken, D.M. Pierce, A Practical Computational Method to Include Osmotically Induced Prestretch/ Prestress in Patient-Specific Finite Element Simulations of Cartilage, 8^{th} World Congress of Biomechanics (WCB)/2018 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Dublin, IR, July 8–12, 2018.
9. Maier, F., C.G. Lewis, D.M. Pierce, Intrinsic Shear Strain Responses of Progressively Osteoarthritic Human Cartilage−Data for Modeling, Insigneo Showcase, Sheffield, UK, May 3, 2018.
8. Maier, F., C.G. Lewis, D.M. Pierce, Through-Thickness Patterns of Shear Strain Change with Progressively Osteoarthritic Human Cartilage, World Congress on Osteoarthritis (OARSI), Liverpool, UK, April 26–29, 2018.
7. Kaplan, J.T., J.W. Ramsay, T.N. Brown, D.M. Pierce, Differences in Knee Joint Load Distribution with Varying Cartilage Properties, 41^{st} Annual Meeting of the American Society of Biomechanics (ASB), Boulder, CO, USA, August 8–11, 2017.
6. Santos, S., H. Kackley, D.M. Pierce, 'Exploring "ME"chanics: The Multiscale Mechanics of Me!' Summary of Outreach Lessons Learned, 2017 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Tucson, AZ, USA, June 21–24, 2017.
5. Kaplan, J.T., H. Drissi, C.P. Neu, D.M. Pierce, Probing the Transition from Compaction to Fatigue in Human Articular Cartilage under Cyclic Loading, 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), National Harbor, MD, USA, June 29–July 2, 2016.
4. Pierce, D.M., Virtual Cartilage: Toward an Interdisciplinary Analysis Framework for Cartilage, Frontiers in Bioengineering Symposium at the University of Illinois, Urbana-Champaign, IL, USA, September 8–9, 2014.
3. Weisbecker, H., D.M. Pierce, G.A. Holzapfel, Pseudo-Elastic Finite Element Modeling of Damage in Arterial Tissue, International Union of Theoretical and Applied Mechanics IUTAM Symposium on Computer Models in Biomechanics: from Nano to Macro, Stanford University, CA, USA, August 29–September 2, 2011.
2. Pierce, D.M. T.U. Cohnert, J. Vander Sloten, G.A. Holzapfel, A Study of Stresses in the Intraluminal Thrombus and Arterial Wall of Abdominal Aortic Aneurysms: Input for the European Commission Project SCATh - Smart Catheterization, 6^{th} World Congress on Biomechanics, Singapore, SG, August 1–6, 2010.
1. Pierce, D.M., J.A. Zimmerman, Tensegrity: Structures of Continuous Tension and Discontinuous Compression, Engineering Sciences Summer Institute Seminar, Sandia National Laboratories, Livermore, CA, USA, September, 2002.

Research Grants

- **COMP-101: Understanding and Predicting Shock Injuries/Survivability in Navy Personnel**
  Awarding Agency: DOD/Navy/Office of Naval Research (ONR)
  Investigators: D.M. Pierce (PI), K. Morgan (Co-PI)
  Award Description: $750,000
  Award Period: 1/25–1/27 (24 Months)

- **Modelling Cartilage Chemo-Mechanobiology with Application to Predicting Osteoarthritis Progression and Treatment**
  Awarding Agency: The Royal Society
  Investigators: P. Watton (PI), D.M. Pierce (Co-PI)
  Award Description: IES\R3\233163 - International Exchanges 2023 Round 3, £12,000 (∼$15,269)
  Award Period: 3/24–3/26 (24 Months)

- **COMP-69: Understanding and Predicting Osteoarthritis in Navy Divers Toward Prevention and Treatment**
  Awarding Agency: DOD/Navy/Office of Naval Research (ONR)
  Investigators: D.M. Pierce (PI), T. Schmidt (Co-PI)
  Award Description: $599,997
  Award Period: 1/24–1/26 (24 Months)

- **Understanding and Manipulating Mechanics-Based Collagen Synthesis to Advance Functional Biomaterials**
  Awarding Agency: National Science Foundation
  Investigators: R. June (PI), D.M. Pierce (Co-PI)
  Award Description: CMMI BMMB 2140127, $445,046
  Award Period: 5/22–4/26 (48 Months)

- **Amendment ID 002: CAREER: Understanding Collagen Microcracks in Soft Tissues Under Normal Body Loads**
  Awarding Agency: National Science Foundation
  Investigators: D.M. Pierce (PI)
  Award Description: CMMI BMMB 1653358, $57,435
  Award Period: 5/22–2/23 (10 Months)

- **SEED-27: Risk Factors for Osteoarthritis in Navy Divers**
  Awarding Agency: DOD/Navy/Office of Naval Research (ONR)
  Investigators: D.M. Pierce (PI)
  Award Description: $105,107
  Award Period: 10/20–8/23 (23 Months)

- **Amendment ID 001: CAREER: Understanding Collagen Microcracks in Soft Tissues Under Normal Body Loads**
  Awarding Agency: National Science Foundation
  Investigators: D.M. Pierce (PI)
  Award Description: CMMI BMMB 1653358, $42,334
  Award Period: 8/20–2/23 (31 Months)

- **The Role of Lumbar Splanchnic Innervations in Visceral Nociception and Pain**
  Awarding Agency: National Institutes of Health
  Investigators: B. Feng (PI), D.M. Pierce (Co-I), S. Emadi (Co-I)
  Award Description: NIDDK 1R01DK120824-01, $1,985,880
  Award Period: 9/19–8/24 (60 Months)

- **Theory and Application Converge in Interactive Computer Programming – A New ME/BME Course to Engage and Retain Advanced Students**
  Awarding Agency: UConn 2018 CETL Mini-Grant Competition
  Investigators: D.M. Pierce (PI)
  Award Description: $5,000
  Award Period: 12/18–12/19 (12 Months)

- **Computational Wrinkle Model for Human Skin**
  Awarding Agency: Unilever United States, Inc.
  Investigators: D.M. Pierce (PI), B. Feng (Co-I)
  Award Description: MA18–674 SRA, $109,349 + $40,183
  Award Period: 8/18–7/19 (12 Months) + 8/19–12/19 (5 months)

- **KEEN Integrated E-Learning Modules Mini-Grant Award**
  Awarding Agency: Kern Family Foundation/Connecticut Innovations
  Investigators: D.M. Pierce (PI)
  Award Description: $2,000
  Award Period: 1/18–5/18 (5 Months)

- **Flipping Over Biomechanics: Improving Outcomes in a Foundational Course for Biomedical Engineers**
  Awarding Agency: UConn 2017 Provost's Academic Plan Mini-Grant Competition
  Investigators: D.M. Pierce (PI)
  Award Description: $5,000
  Award Period: 12/17–6/18 (7 Months)

- **Biomechanical Simulations of Progressing Osteoarthritis to Advance Understanding and Therapies**
  Awarding Agency: National Science Foundation
  Investigators: D.M. Pierce (PI), C.P. Neu (Co-PI)
  Award Description: CMMI BMMB 1662429, $399,950
  Award Period: 9/17–8/20 (36 Months)

- **Understanding the Multiscale Mechanics of Nerve Endings to Address Visceral Pain**
  Awarding Agency: National Science Foundation
  Investigators: B. Feng (PI), D.M. Pierce (Co-PI)
  Award Description: CMMI BMMB 1727185, $432,481
  Award Period: 8/17–7/23 (60 Months)

- **Developing Biofidelic Models as Surrogates for Human Subjects in Protective Clothing and Individual Equipment and Augmentation Testing**
  Awarding Agency: US Army Natick Soldier Research, Development and Engineering Center (NSRDEC)
  Investigators: D.M. Pierce (PI)
  Award Description: W911QY–17–2–0002, $115,000
  Award Period: 7/17–6/19 (24 Months)

- **CAREER: Understanding Collagen Microcracks in Soft Tissues Under Normal Body Loads**
  Awarding Agency: National Science Foundation
  Investigators: D.M. Pierce (PI)
  Award Description: CMMI BMMB 1653358, $500,000
  Award Period: 3/17–2/23 (72 Months)

- **Multiscale Mechanics of Cartilage to Understand Evolving Osteoarthritis**
  Awarding Agency: UConn Research Excellence Program Storrs (REP-Storrs)
  Investigators: D.M. Pierce (PI), G. Lykotrafitis (Co-PI)
  Award Description: $50,000
  Award Period: 8/16–7/17 (12 Months)

- **Strategic Expansion of My Mentorship Network to Include U.S.-Based Mentors**
  Awarding Agency: UConn Micro-Grant Program for Mentoring
  Investigators: D.M. Pierce (PI)
  Award Description: $1,200
  Award Period: 1/15–12/15 (12 Months)

- **Patient-Specific Computational Modeling of Articular Cartilage – Towards Predicting the Progression of Osteoarthritis**
  Awarding Agency: UConn Faculty Large Grant Program
  Investigators: D.M. Pierce (PI)
  Award Description: IFP-130628, $25,000
  Award Period: 1/14–12/14 (12 Months)
- **SCATh: Smart Catheterization Towards Sustainable and Personalized Healthcare**
  Awarding Agency: European Commission, Call ID: FP7–ICT–2009–4, Objective: ICT–4–5.2
  Investigators: J. Vander Sloten (PI); KU Leuven, BE; TU Madrid, ES; UH Rikshospitalet, NO; Zurich HAW, CH; U London, GB; TU Graz, AT (D.M. Pierce (Site PI), G.A. Holzapfel (Co-PI)); SS Sant'Anna, IT; Endosense, CH
  Award Description: Total: €3,113,469 (∼$4,329,131); TU Graz: €379,015 (∼$527,001)
  Award Period: 2/10–1/13 (36 Months)

Advisor

Postdoctoral Scholars

5. Phoebe Szarek: 3/23–9/23
4. Ashkan Almasi: 5/20–11/22
3. Yunmei Zhao: 7/18–2/21
2. Vukašin Štrbac: 9/17–4/19
1. Haoyu Chen: 3/15–3/16

Doctoral Students

11. Annika Kumar: starting 8/26
10. Carolyn Brokowski: 7/24–present
9. Kosar Safari: 12/22–present
8. Amirhossein Shokrani: 2/21–12/24 (currently STEM Specialist, xAI)
7. Muhammed Masudur Rahman: 1/19–12/24 (currently Mechanical Engineering III, ALD Engineering, Applied Materials, Inc.)
6. Phoebe Szarek: 8/17–12/22 (currently Post-Doctoral Fellow at Northeastern University)
5. Xiaogang Wang: 5/16–12/21 (currently R&D Engineer III, Simulation & Modeling at Align Technology, Inc.)
4. Stephany Santos: 5/16–8/20 (currently Assistant Professor in Residence and Executive Director of the Vergnano Institute for Inclusion, University of Connecticut)
3. Franz Maier: 8/14–8/18 (currently Research Assistant, University of Applied Sciences - Upper Austria)
2. Hannah Weisbecker: 2/10–5/14 (together with G.A. Holzapfel)
1. Andreas J. Schriefl: 2/10–1/12 (together with G.A. Holzapfel)

Masters Students

14. Ameet Gambhirwala: 8/24–present
11. Erin Egersheim: 8/23–5/25
12. Isaac Lingenfelter: 8/21–5/23
11. Hannah Pfost: 7/21–5/23

10. Nicholas Monaco: 5/19–5/20
9. Lauren Marshall: 8/17–5/19
8. Bill Luu: 7/17–6/19 (together with M. Upadhyay and S.A. Tadinada)
7. Edward Cronauer: 8/15–6/17 (together with M. Upadhyay and S.A. Tadinada)
6. John Chomack: 8/15–5/16
5. Stephany Santos: 6/14–5/16
4. Bilal Kaleem: 5/14–5/16
3. Jonathan Kaplan: 12/13–5/15
2. Franz Maier: 10/12–6/14
1. Thomas E. Fastl: 7/10–4/13

Professional Membership

- American Society for Engineering Education (ASEE)
- American Society of Mechanical Engineers (ASME)
- Biomedical Engineering Society (BMES)
- Osteoarthritis Research Society International (OARSI)
- Society of Engineering Science (SES)
- US Association for Computational Mechanics (USACM)

Professional Service

Member of Committees, Panels, and Reviews

- **Grant Proposal Reviewer** for the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), Germany.
- **PhD External Examiner** for Brooke Tornifoglio, "An investigation into diffusion tensor imaging-derived metrics in arterial tissue as biomarkers for disease progression, plaque rupture and graft recellularisation," The University of Dublin, Dublin, Ireland (July, 2022).
- **Evaluator of Scientific Merits** for Petri Tanska, application for title of Docent at the University of Eastern Finland (Applied Physics, Computational Mechanobiology), University of Eastern Finland, Kuopio, Finland (June, 2020).
- **Grant Proposal Reviewer** for the Swiss National Science Foundation (SNSF), Switzerland.
- **Chair of the ASME BED Solids Technical Committee** for the Summer Biomechanics, Bioengineering and Biotransport Conference (SBC), 2025–2028.
- **Abstract Reviewer** for the session 'Cartilage: Imaging and Degeneration' at the 2024 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Lake Geneva, WI, USA, June 11–14, 2024.
- **Abstract Reviewer, Session Co-Chair** for the session 'Cartilage: Imaging and Degeneration' at the 2023 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, USA, June 4–8, 2023.
- **Vice Chair of the ASME BED Solids Technical Committee** for the Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), 2022–2025.

- **Abstract Reviewer** for the Ph.D. and M.S. Student, and Student Paper Competitions at the 2022 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C2022), Eastern Shore, MD, USA , June 20–23, 2022. *www.sb3c.org*
- **Grant Proposal Reviewer** for the Irish Research Council, Ireland.
- **Grant Proposal Reviewer** for the Auckland Medical Research Foundation, New Zealand.
- **Grant Proposal Reviewer** for the American Chemical Society Petroleum Research Fund – Doctoral New Investigator (DNI) Grant, USA.
- **On-Site Judge** for the Best Paper and Best Student Presentation Competitions at the 16^{th} International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE) and the 4^{th} Conference on Imaging and Visualization, New York City, NY, USA, August 14–16, 2019. *cmbbe2019.com*
- **Grant Proposal Reviewer** for the Orthopaedic Research and Education Foundation – Total Joint Replacement Research Grant, USA.
- **Abstract Reviewer, On-site Poster and Ph.D. Session Judge** for the Ph.D. and M.S. Student, and Student Paper Competitions at the 2019 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C2019), Seven Springs, PA, USA, June 25–28, 2019. *www.sb3c.org*
- **Panelist** for the NSF Biomechanics and Mechanobiology (BMMB) program.
- **Theme Leader – Musculoskeletal Soft Tissue Biomechanics (Solid Mechanics)** for the Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), 2017–2020. *www.sb3c.org*
- **Abstract Reviewer, On-site Poster and Ph.D. Session Judge** for the Ph.D. and M.S. Student, and Student Paper Competitions at the 2017 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C2017), Tucson, AZ, USA, June 21–24, 2017. *www.sb3c.org*
- **Abstract Reviewer, On-site Poster and Ph.D. Session Judge** for the Ph.D. and M.S. Student, and Student Paper Competitions at the 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C2016), National Harbor, MD, USA, June 29–July 2, 2016. *www.sb3c.org*
- **Opponent in the Public Examination of a Ph.D. Dissertation** for Janne Mäkelä, "Structural and Functional Alterations of Articular Cartilage in Osteoarthritis – Experimental and Computational Examination," University of Eastern Finland, Kuopio, Finland (February, 2016).
- **Grant Proposal Reviewer** for the Research Councils UK Medical Research Council (MRC), UK.
- **Grant Proposal Reviewer** for the National Science Center, Poland (Narodowe Centrum Nauki, NCN).
- **Abstract Reviewer, On-site Poster and Ph.D. Session Judge** for the Ph.D. and M.S. Student, and Student Paper Competitions at the 2015 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C2015), Snowbird, UT, USA, June 17–20, 2015. *www.sb3c2015.org*
- **Panelist, Adhoc Grant Proposal Reviewer** for the NSF Mechanics of Materials and Structures (MOMS) program.
- **Abstract Reviewer and On-site Poster Judge** for the Student Paper Competition at the 7^{th} World Congress of Biomechanics (WCB)/ASME 2014 Summer Bioengineering Conference (SBC), Boston, MA, USA, July 6–11, 2014. *wcb2014.com*
- **Remote Referee** for Research Foundation – Flanders (Fonds Wetenschappelijk Onderzoek – Vlaanderen, FWO).
- **Preliminary Examiner of a Ph.D. Dissertation** for Mika Mononen, "Computational modeling of knee joint mechanics under impact and gait cycle loading – studies based on fibril reinforced models of articular cartilage," University of Eastern Finland, Kuopio, Finland (December, 2012).

Organizer and Chair of Symposia

- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS303 Advances in Computational Biomechanics and Mechaniobiology' (together with C.P. Neu, S. Avril, P. Watton) for the 18^{th} U.S. National Congress on Computational Mechanics (USNCCM), Chicago, IL, USA, July 20–24, 2025.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS0502 Advances in Computational Biomechanics and Mechaniobiology' (together with C.P. Neu, S. Avril, P. Watton) for the 19^{th} International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Vancouver, CA, USA, July 30–August 1, 2024.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS7 − 6 Advances in Computational Biomechanics and Mechaniobiology' (together with C.P. Neu) for the Society of Engineering Science 2023 Annual Technical Meeting (SES 2023), Minneapolis, MN, USA, October 8–11, 2023.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS201 Advances in Computational Biomechanics and Mechaniobiology' (together with C.P. Neu, S. Avril) for the 17^{th} U.S. National Congress on Computational Mechanics (USNCCM), Albuquerque, NM, USA, July 23–27, 2023.
- **Session Co-Chair** at the 2023 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, USA, June 4–8, 2023.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS0413 Advances in Computational Biomechanics and Mechaniobiology' (together with C.P. Neu, R. Van DonKelaar) for the 15^{th} World Congress on Computational Mechanics (WCCM) and the 8^{th} Asian Pacific Congress on Computational Mechanics (APCOM), Yokohama, JP, July 31–August 5, 2022.
- **Session Co-Chair** 'Track: Musculoskeletal 3: Modeling and Simulation, Session: Musculoskeletal Tissue Mechanics and Morphology' (together with P.-Y. Rohan) for the 9^{th} World Congress of Biomechanics (WCB), Taipei, TH, July 10–14, 2022.
- **Special Session Co-Organizer** 'Future Faculty Poster Session' (together with M. Holland, M. Killian, D. Chan, and P. Bayly) for the Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Eastern Shore, MD, US, June 20–23, 2022.
- **Workshop Co-Organizer, Co-Chair** 'Mechanics and Mechanobiology Surrounding Tissue Failure' (together with C.R. Henak, G.D. O'Connell, and C.P. Neu) for the Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), virtual–Whova conference app, June 14–18, 2021.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS075 Advances in Computational Biomechanics' (together with C.P. Neu, R. Van DonKelaar) for the 14^{th} World Congress on Computational Mechanics (WCCM) and the 8^{th} European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS), Paris, FR, July 19–24, 2020 (Rescheduled Virtual, January 11–15, 2021).
- **Mini-Symposia Co-Organizer** 'Computational Design for Biomedical Applications' (together with J. Norato, D.A. Garzón-Alvarado) for the 45^{th} Design Automation Conference, International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (ASME IDETC/CIE), Anaheim, CA, US, August 18–21, 2019.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS401 Advances in Computational Biomechanics' (together with C.P. Neu) for the 15^{th} U.S. National Congress on Computational Mechanics (USNCCM), Austin, TX, US, July 28–August 1, 2019.
- **Workshop Co-Organizer, Co-Chair** 'Multiscale Musculoskeletal Mechanics across Interfaces' (together with M.E. Kersh, M. Fisher) at the 2019 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Seven Springs, PA, US, June 25–28, 2019.

- **Session Co-Chair** for the session 'Mechanics of Cartilage and Meniscus' at the 2019 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Seven Springs, PA, US, June 25–28, 2019.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS1805 Data-Driven Computational Biomechanics' (together with C.P. Neu) for the 13^{th} World Congress in Computational Mechanics (WCCM), New York, NY, US, July 22–27, 2018.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'Synergy of Image-Based Modeling and Model-Based Imaging for Probing Biological Systems' (together with C.P. Neu) for the World Congress of Biomechanics (WCB), Dublin, IE, July 8–12, 2018.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS101 Advances in Computational Biomechanics' (together with C.P. Neu) for the 14^{th} U.S. National Congress on Computational Mechanics (USNCCM), Montréal, QC, CA, July 17–20, 2017.
- **Session Co-Chair** for the session 'Mechanics and Modeling of Musculoskeletal Soft Tissues' at the 2017 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Tucson, AZ, US, June 21–24, 2017.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS029 The Synergy of Mechanics-Based Imaging and Imaging-Based Mechanics in Studying Biological Tissues' (together with C.P. Neu) for the 12^{th} World Congress on Computational Mechanics (WCCM) and the 6^{th} Asia-Pacific Congress on Computational Mechanics (APCOM), Seoul, KR, July 24–29, 2016.
- **Session Co-Chair** for the session 'Musculoskeletal Soft Tissue: Cartilage' at the 2016 Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), National Harbor, MD, US, June 29–July 2, 2016.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS101 Topics in Computational Biomechanics' (together with R. Grytz) for the 13^{th} U.S. National Congress on Computational Mechanics (USNCCM), San Diego, CA, US, July 26–30, 2015.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'The Mechanics of Cartilage' (together with T. Ricken) for the 9^{th} European Solid Mechanics Conference (ESMC), Madrid, ES, July 6–10, 2015.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'MS2.3 Cartilage Mechanics: Characterization and Computational Modeling' (together with D.A. Reiter) for the 12^{th} U.S. National Congress on Computational Mechanics (USNCCM), Raleigh, NC, US, July 22–25, 2013.
- **Local Organizing Committee Member, Session Co-Chair** for the 8^{th} European Solid Mechanics Conference (ESMC), Graz, AT, July 9–13, 2012.
- **Mini-Symposia Co-Organizer, Session Co-Chair** 'Constitutive Modeling of Articular Cartilage' (together with T. Ricken) for the 8^{th} European Solid Mechanics Conference (ESMC), Graz, AT, July 9–13, 2012.
- **Programme Committee Member, Session Co-Organizer** 'Biomechanics & Biomaterials' for the 2^{nd} International Conference on Material Modelling (ICMM) incorporating the 12^{th} European Mechanics of Materials Conference, Paris, FR, August 31–September 2, 2011.
- **Co-Organizer, Technical Committee Member, Co-Editor** for the Joint Workshop on New Technologies for Computer/Robot Assisted Surgery, Graz, AT, July 11–13, 2011.

Journal Board Member

- **Associate Editor** for ASME Journal of Biomechanical Engineering.
- **Topic Editorial Board Member** for MDPI Bioengineering.
- **Reviewer Board** for MDPI Nanomaterials.

Journal Referee

- 3D Printing and Additive Manufacturing (3DP)
- Acta Biomaterialia
- Acta Biotheoretica
- Advanced Science
- European Journal of Applied Mathematics (EJAM)
- Archive of Applied Mechanics (AOAM)
- ASME Journal of Applied Mechanics (JAM)
- Applied Mechanics Reviews (AMR)
- Artificial Intelligence In Medicine (AIIM)
- MDPI Bioengineering
- Annals of Biomedical Engineering (ABME)
- Biomedical Engineering Advances (BEA)
- ASME Journal of Biomechanical Engineering (JBE)
- Journal of Biomechanics (JB)
- Biomechanics and Modeling in Mechanobiology (BMMB)
- Universal Journal of Biomedical Engineering (UJBE)
- Journal of Biomedical Graphics and Computing (JBGC)
- IEEE Journal of Biomedical and Health Informatics (JBHI)
- Journal of Bionic Engineering (JBE)
- BMC Mechanical Engineering (BMEN)
- BMC Hereditas (HERE)
- International Journal of Cardiovascular Imaging (IJCI)
- Clinical and Translational Medicine (CTM)
- PLOS Computational Biology
- Computational and Mathematical Methods in Medicine (CMMM)
- Computational and Structural Biotechnology Journal (CSBJ)
- International Journal for Computational Vision and Biomechanics (IJCVB)
- Computer Methods and Programs in Biomedicine (CMPB)
- Computer Methods in Applied Mechanics and Engineering (CMAME)
- Computer Methods in Biomechanics and Biomedical Engineering (CMBBE)
- Computers in Biology and Medicine (CIBM)
- ASME Journal of Electronic Packaging (JEP)
- Finite Elements in Analysis & Design (FINEL)
- Frontiers in Bioengineering and Biotechnology – Biomechanics

- Imaging in Medicine (IM)
- Journal of International Medical Research (JIMR)
- JBMR Plus
- Journal of Magnetic Resonance Imaging (JMRI)
- Magnetic Resonance in Medicine (MRM)
- MDPI Materials
- Journal of Materials Science (JMSC)
- Measurement
- Meccanica
- Journal of the Mechanical Behavior of Biomedical Materials (JMBBM)
- Journal of the Mechanics and Physics of Solids (JMPS)
- European Journal of Mechanics / A Solids (EJMSOL)
- Mechanics of Materials (MECMAT)
- Mechanobiology in Medicine (MBM)
- IPEM Medical Engineering & Physics (MEP)
- International Journal of Molecular Sciences (IJMS)
- MDPI Nanomaterials
- International Journal for Numerical Methods in Biomedical Engineering (IJNMBE)
- Journal of Orthopaedic Research (JOR)
- Journal of Orthopaedic Surgery and Research (JOSR)
- Osteoarthritis and Cartilage (OAC)
- PLOS ONE (PONE)
- Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences (RSPA)
- Journal of the Royal Society Interface (JRSI)
- Journal of the Royal Society Open Science (JRSOS)
- Scientific Reports
- Sensors
- Soft Materials
- Surgical and Experimental Pathology (SAEP)
- Tissue Engineering (TE)
- Journal of Tissue Engineering (JTE)
- IEEE Transactions on Medical Imaging (IEEE TMI)
- Journal of Translational Medicine (JTRM)
- Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)

Other Service

- **Faculty Advisor** for the University of Connecticut ME Graduate Student Association.
- **Faculty Advisor** for the University of Connecticut Student Cycling Team.
- **Faculty Mentor** for the ASB Mentorship Program from the American Society of Biomechanics.
- **Stanford Alumni Mentor** for the Stanford Alumni Mentoring (SAM) Program.

Honors and Awards

- Elected Fellow, *American Society of Mechanical Engineers (ASME)*, 10/2024.
- Elected Member, *Connecticut Academy of Science and Engineering (CASE)*, 02/2024.
- Recipient, *Stillwater Area High School Distinguished Alumni Award*, 06/2023.
- CMMI Panel Fellow, *NSF CMMI's Game Changer Academies for Advancing Research Innovation (CGCA)*, 10/2021.
- United States Provisional Patent: Application No. 63/172,844 *Surgical Training Device*, 2021.
- United Technologies Corporation Professor in Engineering Innovation ($15,000) in the School of Engineering, University of Connecticut, 01/20.
- Lauren Marshall (Masters Candidate in the imLab), third place ME Graduate Research Contest ($1,000), Department of Mechanical Engineering, University of Connecticut, 4/19.
- Stephany Santos (Doctoral Candidate in the imLab), earned the 'Inspiring STEM Equitability Award' of the 'Women of Innovation Awards,' the Connecticut Technology Council, 3/19.
- Lauren Marshall (Masters Candidate in the imLab), earned 2^{nd} place overall in SOE (1^{st} place in Department of ME), in the 5^{th} annual SAGE Graduate Engineering Poster Competition, University of Connecticut, 3/19.
- "NETI Teacher-Scholar" award to attend the Advanced National Effective Teaching Institute workshop (NETI-2), The National Effective Teaching Institute, 6/18.
- Xiaogang Wang (Doctoral Candidate in the imLab), second place ME Graduate Research Contest ($1,300), Department of Mechanical Engineering, University of Connecticut, 4/18.
- Computer Methods in Biomechanics and Biomedical Engineering Best Paper 2013 (€1,000) awarded for *A Hyperelastic Biphasic Fibre-Reinforced Model of Articular Cartilage Considering Distributed Collagen Fibre Orientations: Continuum Basis, Computational Aspects and Applications*, published by David M. Pierce, Tim Ricken, and Gerhard A. Holzapfel, 3/18.
- ME Early Career Faculty Scholar Award ($10,000), Department of Mechanical Engineering, University of Connecticut, 6/17.
- Stephany Santos (Doctoral Candidate in the imLab), earned a Ford Foundation Fellowship ($95,000), National Academies of Sciences, Engineering, and Medicine, 4/17.
- Scholarship to attend the 31^{st} National Effective Teaching Institute workshop (NETI-1) ($3,000), School of Engineering, University of Connecticut, 6/16.
- Franz Maier (Doctoral Candidate in the imLab), first place ME Graduate Research Contest ($2,000), Department of Mechanical Engineering, University of Connecticut, 4/16.
- Honorable Mention in the Poster Competition at the Frontiers in Bioengineering Symposium, University of Illinois at Urbana-Champaign, 9/14.
- United States Patent: US 7,979,237 *Fracture Prediction for Crystalline Microstructures*, 2011.
- Research Assistantship provided by a grant from Sandia National Laboratories, 9/03–9/06.

- United States Patent: US D479,474 S *Design for Process Device*, 2003.
- Fellowship with Sandia National Laboratories Microsystem Materials Department, 6/03–9/03.
- Fellowship with Sandia National Laboratories Engineering Sciences Summer Institute (ESSI), 6/02–9/02.
- Research Assistantship provided by a grant from Cisco Systems Inc., 9/00–9/01.
- James F. Lincoln Arc Welding Foundation National Engineering Design Competition Bronze Award: *Voluntary Cow Milking System - Smart Milking Cup Design*, 2000.

Teaching Experience

Professor (8/23–present)
University of Connecticut. Storrs, Connecticut
- Design of Machine Elements, ME 3227 (undergraduate, 1×)
- Basic Concepts of Continuum Mechanics, ME 5105 (graduate, 2×)
- ME/BME Senior Design, ME 4972/4973W-BME 4900/4910W (3×, 1–3 teams per year)

Associate Professor (8/18–8/23)
University of Connecticut. Storrs, Connecticut
- Basic Concepts of Continuum Mechanics, ME 5105 (graduate, 1×)
- Advanced Biomechanics of Soft Tissues, ME 5895/3295-BME 6086/4985 (graduate, 2×)
- BioSolid Mechanics, ME 5895/3295-BME 6620/4600 (undergraduate/graduate, 1×)
- Biomechanics, BME 3600 (undergraduate, 3×)
- ME/BME Senior Design, ME 4972/4973W-BME 4900/4910W (4×, 1–3 teams per year)

Assistant Professor (8/13–8/18)
University of Connecticut. Storrs, Connecticut
- BioSolid Mechanics, ME 5985/3230-BME 6620/4600 (undergraduate/graduate, 5×)
- Biomechanics, BME 3600/W (undergraduate, 5×)
- ME/BME Senior Design, ME 4972/4973W-BME 4900/4910W (5×, 1–3 teams per year)

Universitätsassistent (Assistant Professor) (10/08–8/13)
Graz University of Technology. Graz, Austria
- Computational Biomechanics, 450.011 (graduate, 2×)
- Mechanics for Biomedical Engineers, 450.008 (undergraduate, 4×)
- Computational Biomechanics, 450.005 (graduate, 3×)
- Mechanics for Biomedical Engineers, 450.002/.012 (undergraduate, 1×)

Teaching Affiliate (Course Instructor) (3/04–6/04)
Stanford University. Stanford, California
- Finite Element Analysis in Mechanical Design, ME 309 (graduate, 1×)

Professional Development

NSF CGCA's Advanced Panel Fellow Program (APF) (10/22)
Synchronous Virtual Course. Online

NSF CMMI's Game Changer Academies for Advancing Research Innovation (CGCA) (4–10/21)
Synchronous and Asynchronous Virtual Course. Online

Grant Training Center: Writing/Designing DOD Proposals (7/21)
Virtual Webinar. Online

ASEE National Effective Teaching Institute (NETI-2) Workshop (6/18)
Hilton Salt Lake City Center. Salt Lake City, UT

Helping STEM Students Develop High-Level Skills (9/17)
University of Connecticut. Storrs, CT

First Annual Advising Retreat (8/17)
University of Connecticut. Storrs, CT

NSF Day Workshop (10/16)
Cross Center. Bangor, ME

ASEE National Effective Teaching Institute (NETI-1B) Workshop (6/16)
Hilton Riverside Hotel. New Orleans, LA

CETL Faculty Teaching Workshop (5/16)
University of Connecticut. Storrs, CT

CETL Faculty Teaching Workshop (5/15)
University of Connecticut. Storrs, CT

Grant Writers' Seminars and Workshops: NSF Session (3/15)
University of Connecticut. Storrs, CT

Grant Writers' Seminars and Workshops: NIH Session (3/15)
University of Connecticut. Storrs, CT

Grant Writers' Seminars and Workshops: NSF CAREER Award Proposals (4/14)
University of Connecticut. Storrs, CT

Grant Writers' Seminars and Workshops: Write Winning Grants (3/14)
University of Connecticut. Storrs, CT

Summer School on Modeling and Simulation in Soft Tissue Biomechanics: from Structure to Macroscopic Response (9/12)
Graz University of Technology. Graz, AT

Nonlinear Computational Solid and Structural Mechanics: Theoretical Formulations, Technologies and Computations (4/12)
University of Pavia. Pavia, IT

Summer School on Modeling in Biomechanics and Mechanobiology at Different Length Scales (7/10)
Graz University of Technology. Graz, AT

Summer School on Modeling and Computation in Biomechanics (9/08)
Graz University of Technology. Graz, AT

Science and Engineering Education Scholars Program (SEESP) (7/04)
Pennsylvania State University. University Park, PA

Industry Experience

Consultant (4/11–present)
A.M. Fitzgerald & Associates, LLC. Burlingame, CA
- Conducting research; consulting on computational modeling and analysis-driven design in areas of MEMS, engineering materials, sensor systems and medical devices.

Associate (9/06–4/11)
A.M. Fitzgerald & Associates, LLC. Burlingame, CA
- Conducted research (resulted in patent); provided computational modeling, analysis-driven design in areas of MEMS, engineering materials, sensor systems and medical devices.

Engineering Consultant (7/06–8/06)
Quanterion Solutions, Inc. Utica, NY
- Provided ANSYS technical support for Phase I Small Business Innovation Research (SBIR) contract: "Long Term Missile Aging Reliability Prediction for Lead-Free Solder Connections."

Engineering Consultant (12/99–1/00)
Covington & Burling, LLP. New York, NY
- Reviewed key design features of patented mechanisms, submitted patent reports for attorneys.

Mechanical Design Engineer (12/98–9/99)
Rosemount, Inc. Chanhassen, MN
- Analyzed, co-developed next generation radar fluid-level sensor devices.
- Co-designed the company's first plastic electronics packaging for industrial temperature sensors.

Engineering Consultant (6/96)
Floating Arms, Inc. (formerly Workplace Designs, Inc.) Stillwater, MN
- Assisted in development of mechanical linkage between a split ergonomic keyboard and arms of an ergonomic chair.

Technical-Aid (6/94–6/97)
3M Company. St. Paul, MN
- Designed experiments, collected and analyzed data, and applied results for Flexographic print tapes and plates.