

Benjamin B Wheatley, PhD

Curriculum Vitae

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PROFESSIONAL APPOINTMENTS

Bucknell University (Lewisburg, PA)

Associate Professor, Department of Mechanical Engineering	2023 – Present
Assistant Professor, Department of Mechanical Engineering	2017 – 2023

Geisinger (Danville, PA)

Fellow, Musculoskeletal Institute	2023 – 2024
Assistant Professor, Musculoskeletal Institute	2019 – 2020

Geisinger Commonwealth School of Medicine (Scranton, PA)

Adjunct Assistant Professor of Orthopaedics	2021 – Present
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EDUCATION

Ph.D., Mechanical Engineering	2017
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Colorado State University (Fort Collins, CO)

Dissertation: Finite element analysis of skeletal muscle: A validated approach to modeling muscle force and intramuscular pressure.

B.S., Engineering	2011
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Trinity College (Hartford, CT)

PUBLICATIONS

Refereed Journal Articles

30. Vandenberg, N.W., **Wheatley, B.B.**, Carpenter, R.D., Christiansen, C.L., Stoneback, J.W., & Gaffney, B.M.M. (2024). Feasibility of predicting changes in gait biomechanics following muscle strength perturbations using optimal control in patients with transfemoral amputation, *Computer Methods in Biomechanics and Biomedical Engineering*, doi: 10.1080/10255842.2024.2399038

29. Mayers, A.J., Hayes, D., Chaclas, N., Vogel, M., Grega, K., **Wheatley, B.B.**, & Seeley, M.A. (2024). Partially Threaded Screws Require More Work During Removal Compared to Fully Threaded Screws in a Bone Simulation Model, *Journal of the Pediatric Orthopaedic Society of North America*, 6(8). doi: 0.1016/j.jposna.2024.100099.

28. Dyer, O. L., Seeley, M. A., & **Wheatley, B.B.** (2024). Effects of static exercises on hip muscle fatigue and knee wobble assessed by surface electromyography and inertial measurement unit data. *Scientific Reports*. doi: 10.1038/s41598-024-61325-7

27. Chaclas, N.A., Dyer, O.L., Mayers, A.J., **Wheatley, B.B.**, Grandizio, L.C., & Seeley, M.A. (2023). Eye of the Carpenter: How Well Do Orthopaedic Surgeons Estimate Angular

Measurements in Derotational Osteotomies? *Journal of Pediatric Orthopaedics*. doi: 10.1097/BPO.0000000000002525

26. Wheatley, B.B., Dyer, O.L., Tully, E.E., & Seeley, M.A. (2023). Aponeurosis Structure-Function Properties: Evidence of Heterogeneity and Implications for Muscle Function. *Acta Biomaterialia*. 168. doi: 10.1016/j.actbio.2023.06.035

25. Holbert, S.E., Holbert, J.A., **Wheatley, B.B.**, & Seeley, M.A. (2023). Breaking Down Torsional Malalignment Syndrome. *SN Comprehensive Clinical Medicine*. 5, 112. doi: 10.1007/s42399-023-01449-5

24. Wheatley, B. B., Gilmore, E. C., Fuller, L. H., Drake, A. M., & Donahue, S. W. (2023). How the geometry and mechanics of bighorn sheep horns mitigate the effects of impact and reduce the head injury criterion. *Bioinspiration & Biomimetics*. 2, 18(2). doi: 10.1088/1748-3190/acb478

23. Dyer, O. L., **Wheatley, B. B.**, & Seeley, M. A. (2023). Short-term vancomycin and buffer soaking does not change rabbit achilles tendon tensile material properties. *Clinical Biomechanics*. 102, 105874. doi: 10.1016/j.clinbiomech.2023.105874

22. Wheatley, B.B., Chaclas, N.A., & Seeley, M.A. (2022). Patellofemoral Joint Load and Knee Abduction/Adduction Moment are Sensitive to Variations in Femoral Version and Individual Muscle Forces. *Journal of Orthopaedic Research*. 41(3), 570-582. doi: 10.1002/jor.25396

21. Habibian, S., **Wheatley, B.B.**, Bae, S., Shin, J., Buffinton, K.W. (2022). Evaluation of two complementary modeling approaches for fiber-reinforced soft actuators. *ROBOMECH Journal*. 9, 2. doi: 10.1186/s40648-022-00225-9

20. Lavigne, T., Sciumè, G., Laporte, S., Pillet, H., Urcun, S., **Wheatley, B.B.**, & Rohan, P.Y. (2022). Numerical investigation of the time-dependent stress-strain mechanical behaviour of skeletal muscle tissue in the context of pressure ulcer prevention. *Clinical Biomechanics*. 105592. doi: 10.1016/j.clinbiomech.2022.105592

19. Geswell, M., Sinha, N., Mandel, M., **Wheatley, B.B.**, Mirenda, W., & Seeley, M. (2021). Improving Resident Education Through Unstable Chicken Hips. *Journal of Pediatric Orthopaedics B*. doi: 10.1097/BPB.0000000000000762

18. Aguirre, T.G., Fuller, L.H., Ingrole, A., Seek, T.W., **Wheatley, B.B.**, Steineman, B.D., Haut Donahue, T.L., & Donahue, S.W. (2020). Bioinspired material architectures from bighorn sheep horncore velar bone for impact loading applications. *Scientific Reports*. 10, 18916. doi: 10.1038/s41598-020-76021-5

17. Wheatley, B.B. (2020). Investigating Passive Muscle Mechanics with Biaxial Stretch. *Frontiers in Physiology*. doi: 10.3389/fphys.2020.01021

16. Grega, K.L., Segall, R.S., Vaidya, A.J., Fu, C., & **Wheatley, B.B.** (2020). Anisotropic and Viscoelastic Tensile Mechanical Properties of Aponeurosis: Experimentation, Modeling, and Tissue Microstructure. *Journal of the Mechanical Behavior of Biomedical Materials*. 110, 103889. doi: 10.1016/j.jmbbm.2020.103889

15. Mayers, A.J., Hayes, D., **Wheatley, B.B.**, Seeley, M.A., & Widmaier, J. (2020). Surgical/Technical Tips SCFE Screw Removal with Coring Reamer. *Journal of the Pediatric Orthopaedic Society of North America*. 2(1). doi: 10.55275/JPOSNA-2020-60

14. Vaidya, A.J. & **Wheatley, B.B.** (2019). An experimental and computational investigation of the effects of volumetric boundary conditions on the compressive mechanics of passive skeletal muscle. *Journal of the Mechanical Behavior of Biomedical Materials*. 102. doi: 10.1016/j.jmbbm.2019.103526

- 13.** Sinha, N., Cornell, M., **Wheatley, B.B.**, Munley, N. & Seeley, M. (2019). Looking Through a Different Lens: Patient Satisfaction with Telemedicine in Delivering Pediatric Fracture Care. *Journal of the American Academy of Orthopaedic Surgeons Global Research & Reviews*. 3(9), e(100). doi: 10.5435/JAAOSGlobal-D-19-00100
- 12.** Wolynski, J., **Wheatley, B.B.**, & Haut Donahue, T.L. (2019). Finite Element Analysis of the Jaipur Foot: Implications for Design Improvement. *Journal of Prosthetics & Orthotics*. doi: 10.1097/JPO.0000000000000253
- 11.** **Wheatley, B.B.**, Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2018). Modeling Skeletal Muscle Stress and Intramuscular Pressure: A Whole Muscle Active-Passive Approach. *Journal of Biomechanical Engineering*. 140(8), 081006. doi: 10.1115/1.4040318
- 10.** Teater, R.H., Fischenich, K.M., **Wheatley, B.B.**, Abrams, L., Sorby, S.A., Singh Mali, H., Jain, A., & Haut Donahue, T.L. (2018). Assessment of the compressive and tensile mechanical properties of materials used in the Jaipur Foot prosthesis. *Prosthetics & Orthotics International*. doi: 10.1177/0309364618767143
- 9.** **Wheatley, B.B.**, Fischenich, K.M., Abrams, L.A., Sorby, S.A., Singh Mali, H., Jain, A.K., & Haut Donahue, T.L. (2017). An International Fellowship Experience for Engineering Undergraduates: Improving Technical, Teamwork, and Cultural Competency. *International Journal of Engineering Education*. 33(4), 1189-1198.
- 8.** **Wheatley, B.B.**, Odegard, G.M., Kaufman, K.R., Haut Donahue, T.L. (2017). A validated model of passive skeletal muscle to predict force and intramuscular pressure. *Biomechanics and Modeling in Mechanobiology*. 16(3), 1011-1022. doi: 10.1007/s10237-016-0869-z.
- 7.** **Wheatley, B.B.**, Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2017). A case for poroelasticity in skeletal muscle finite element analysis: experiment and modeling. *Computer Methods in Biomechanics and Biomedical Engineering*. 20(6), 598-601. doi: 10.1080/10255842.2016.1268132.
- 6.** Drake, A.M., Haut Donahue, T.L., Stansloski, M., Fox, K., **Wheatley, B.B.**, & Donahue, S. W. (2016). Horn and horncore trabecular bone of bighorn sheep rams absorbs impact energy and reduces brain cavity accelerations during high impact ramming of the skull. *Acta Biomaterialia*. 136(11), 41-50. doi: 10.1016/j.actbio.2016.08.019
- 5.** **Wheatley, B.B.**, Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2016). How does tissue preparation affect skeletal muscle transverse isotropy? *Journal of Biomechanics*. 49 (13): 3056–3060. doi: 10.1016/j.jbiomech.2016.06.034.
- 4.** **Wheatley, B.B.**, Pietsch, R.B., Haut Donahue, T.L., & Williams, L.N. (2016). Fully non-linear hyper-viscoelastic modeling of skeletal muscle in compression. *Computer Methods in Biomechanics and Biomedical Engineering*. 19(11), 1181-1189. doi: 10.1080/10255842.2015.1118468
- 3.** **Wheatley, B.B.**, Morrow, D.A., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2016). Skeletal muscle tensile strain dependence: hyperviscoelastic nonlinearity. *Journal of the Mechanical Behavior of Biomedical Materials*. 53, 445-454. doi: 10.1016/j.jmbbm.2015.08.041
- 2.** **Wheatley, B.B.**, Fischenich, K.M., Button, K.D., Haut, R.C., & Haut Donahue, T.L. (2015). An optimized transversely isotropic, hyper-poro-viscoelastic finite element model of the meniscus to evaluate mechanical degradation following traumatic loading. *Journal of Biomechanics*. 48(8), 1454-1460. doi: 10.1016/j.jbiomech.2015.02.028

1. Pietsch, R., **Wheatley, B.B.**, Haut Donahue, T.L., Gilbrech, R., Prabhu, R., Liao, J., & Williams, L.N. (2014). The anisotropic compressive properties of porcine muscle tissue. *Journal of Biomechanical Engineering*. 136(11), 111003. doi: 10.1115/1.4028088

Conference Proceedings

65. Rashedi, M. & Wheatley, B.B. (2025). The Development and Implementation of a Computational Framework to Simulate Patellofemoral Joint Mechanics: Direct Comparisons Between Musculoskeletal Modeling and Finite Element Analysis. *The Orthopaedic Research Society. Charlotte, NC.*

64. Jackson, P.B. & Wheatley, B.B. (2025). The Development and Implementation of a Method to Measure Aponeurosis Failure Properties Under Uniaxial Tension. *Biomedical Engineering Society Annual Meeting. San Diego, CA.*

63. Wheatley, B.B. (2025). The Role of Direct Measurements of Intramuscular Pressure in Modeling Muscle Tissue Mechanics. *Computer Methods in Biomechanics and Biomedical Engineering. Barcelona, Spain.*

62. Wheatley, B.B., Valentine, G.A., & Rohan, P.Y. (2025). Indentation Reveals Insight Into the Role of Fluid Pressurization on Skeletal Muscle Stiffness. *Computer Methods in Biomechanics and Biomedical Engineering. Barcelona, Spain.*

61. Wheatley, B.B., Iachini, A.M, & Rohan, P.Y. (2025). Investigating Strain-Rate Dependent Behavior in Skeletal Muscle: Uniaxial Tension Data and Computational Insights on Damage Mechanisms. *Computer Methods in Biomechanics and Biomedical Engineering. Barcelona, Spain.*

60. Wheatley, B.B., Clarke, A.K., Granger, K.M., & Seeley, M.A. (2025). Comparing Torsional Gait Kinematics Between Marker-Based and Markerless Motion Capture. *American Society of Biomechanics, Pittsburgh, PA.*

59. Valentine, G.A. & Wheatley, B.B. (2025). Measuring Whole and Sectioned Skeletal Muscle Stiffness with Microindentation. *American Society of Biomechanics, Pittsburgh, PA.*

58. Iachini, A.M. & Wheatley, B.B. (2025). Failure Properties of Muscle-Tendon Units Under Passive Tension at Different Strain Rates. *American Society of Biomechanics, Pittsburgh, PA.*

57. Reimer, B.H., Vessicchio, C.M., & Wheatley, B.B. (2025). The Design of a Bighorn Sheep Horn Bioinspired Impact Mitigation System. *American Society of Biomechanics, Pittsburgh, PA.*

56. Vandenberg N.W., Wheatley B.B., Carpenter R.D., Melton D., Christiansen C.L., Stoneback J.L., & Gaffney B.M. (2025). Simulated Movement Symmetry Improves Joint Loading Symmetry in Unilateral Transfemoral Bone-Anchored Limb Users. *I.S.P.O. 20th World Congress, Stockholm, Sweden.*

55. Lehker, M.E., Seeley, M.A., & Wheatley, B.B. (2024). Asymmetry of Lower Limb Muscle Fatigue and Knee Wobble During a Wall Sit. *Biomedical Engineering Society Annual Meeting. Baltimore, MD.*

54. Vandenberg, N.W., Wheatley, B.B., Carpenter, R.D., Christiansen, C.L., Stoneback, J.W., & Gaffney, B.M. (2024). Feasibility of In-Silico Gait Retraining for Patients with Unilateral Transfemoral Bone-Anchored Limbs. *American Society of Biomechanics. Madison, WI.*

53. Wheatley, B.B., Clarke, A.K., Voigt, M.J., & Seeley, M.A. (2024). Modeling Femoral Anteversion and Foot Orthosis Interventions to Reduce Joint Loads. *American Society of Biomechanics. Madison, WI.*

52. Wheatley, B.B., Moerman, K.M., & Rohan, P.Y. (2024). A Microstructural Finite Element

Model of Passive Skeletal Muscle Validated Under Tension and Compression. *European Society of Biomechanics*. Edinburgh, Scotland.

51. Clarke, A.K., Ahn, C., & **Wheatley, B.B.** (2024). Topological Data Analysis Improves Estimations of Muscle Fatigue from Surface Electromyography Data. *European Society of Biomechanics*. Edinburgh, Scotland.

50. Vandenberg, N.W., **Wheatley, B.B.**, Awad, M., Melton, D.L., Christiansen, C.L., Stoneback, J.W., & Gaffney, B.M. (2023). Predicting the Effects of Hip Strength Changes on Gait Dynamics in Patients with Transfemoral Amputation. *American Society of Biomechanics*. Knoxville, TN.

49. Dyer, O.L., **Wheatley, B.B.**, & Seeley, M.A. (2023). Effects of Static Exercises on Hip Muscle Fatigue Assessed by Surface Electromyography. *American Society of Biomechanics*. Knoxville, TN.

48. Schaefer, J.M., Drake, A.M., & **Wheatley, B.B.** (2023). Bioinspired Horn Shaped Oscillators for Mitigating the Effects of Impact. *American Society of Biomechanics*. Knoxville, TN.

47. Calisi, J.P. & **Wheatley, B.B.** (2023). Determining the Effect of Elbow and Wrist Angles on Maximum Voluntary Contraction Surface Electromyography Signals of Upper Extremity Muscles. *American Society of Biomechanics*. Knoxville, TN.

46. **Wheatley, B.B.**, Dyer, O.L., & Seeley, M.A. (2023). Aponeurosis Heterogeneous Material Properties: Evidence and Implications for Muscle Strain. *Computer Methods in Biomechanics and Biomedical Engineering*. Paris, France.

45. Clarke, A.K., **Wheatley, B.B.**, & Ahn, C. (2023). Detecting Muscle Fatigue in Surface EMG Data Through Topological Data Analysis. *Computer Methods in Biomechanics and Biomedical Engineering & American Society of Biomechanics*. Paris, France & Knoxville, TN.

44. Dyer, O.L., Seeley, M.A., & **Wheatley, B.B.** Short-Term Buffer and Antibiotic Soaking Does Not Affect Tendon Modulus and Toe-Region Length. (2023). *The Orthopaedic Research Society*. Dallas, TX.

43. **Wheatley B.B.**, Dyer, O.L., & Seeley, M.A. (2023). Aponeurosis Structure-Function Mechanisms: Inhomogeneity of Microstructure Waviness and Materials Properties. *The Orthopaedic Research Society*. Dallas, TX.

42. Vandenberg N., Stoneback J., Christiansen C., Awad M., Melton D., **Wheatley B.**, & Gaffney B. (2023). Predicting Effects of Muscle Strength Changes on Joint Loading after Transfemoral Osseointegrated Prostheses. *The Orthopaedic Research Society*. Dallas, TX.

41. Voigt, M.J., Chaclas, N.A., Seeley, M.A., & **Wheatley, B.B.** (2022). Modeling the Effects of Femoral Anteversion and Miserable Malalignment on Hip Joint Loads. *Biomedical Engineering Society Annual Meeting*. San Antonio, TX.

40. Mayers, A.J., Hayes, D., Chaclas, N.A., Grega, K., Vogel, M., Seeley, M.A., & **Wheatley, B.B.** (2022). Comparing Removal Torques Between Partially and Fully Threaded SCFE Screws. *Society of Military Orthopaedic Surgeons Annual Meeting*. Scottsdale, AZ.

39. Seeley, M., Koshinski, J., Saloky, K., Cornell, M., **Wheatley, B.**, & Harding, J. (2022). Understanding Pain Coping Strategies and their Potential Application to Pediatric Orthopaedics. *Pediatric Orthopedic Society of North America Annual Meeting*. Vancouver, BC.

38. Chaclas, N., Grega, K., Vogel, M., Mayers, A., Seeley, M., & **Wheatley, B.B.** (2022). Clinically Relevant Variations in Surgical Screw Properties. *Pediatric Orthopedic Society of North America Annual Meeting & American Academy of Orthopaedic Surgeons Annual Meeting*. Vancouver, BC & Chicago, IL.

- 37.** Chaclas, N., Grandizio, L., Seeley, M., & **Wheatley, B.B.** (2022). Eye of the Carpenter: How Well do Orthopaedic Surgery Residents and Faculty Estimate Angular Measurements in Derotational Osteotomies? *Pediatric Orthopedic Society of North America Annual Meeting & American Academy of Orthopaedic Surgeons Annual Meeting*. Vancouver, BC & Chicago, IL.
- 36.** Lavigne, T.J.H., Sciumè, Laporte, S., Pillet, H., Urcun, S., **Wheatley, B.B.**, & Rohan, P.Y. (2021-2022). The possible role of poro-elasticity in the apparent viscoelastic behaviour of passive muscle under confined compression. *Société de Biomechanique Congress. St. Etienne, France. & World Congress of Biomechanics*. Taipei, Taiwan.
- 35.** Bhuiyan, M.U. & **Wheatley, B.B.** (2022). Tensile Stiffness of Skeletal Muscle Under Uniaxial Versus Biaxial Stretch. *Summer Biomechanics, Bioengineering, & Biotransport Conference*. Cambridge, MD.
- 34.** Dyer, O.L., Seeley, M.A., & **Wheatley, B.B.** (2021-2022). Visual Characterization of Aponeurosis Microstructure. *Biomedical Engineering Society Annual Meeting. Virtual. & Summer Biomechanics, Bioengineering, & Biotransport Conference*. Cambridge, MD.
- 33.** Lorza, S.S., Seeley, M.A., Rohan, P.Y., & **Wheatley, B.B.** (2021-2022). The Relationship Between Compression and Intramuscular Pressure of Skeletal Muscle. *Biomedical Engineering Society Annual Meeting. Virtual. & Summer Biomechanics, Bioengineering, & Biotransport Conference*. Cambridge, MD.
- 32.** **Wheatley, B.B.** & Seeley, M.A. (2021). Modeling the Effect of Femoral Anteversion on Gait Dynamics. *Meeting of the American Society of Biomechanics & International Society of Biomechanics Technical Group on Computer Simulation*. Virtual (both).
- 31.** Tully, E.E. & **Wheatley, B.B.** (2021). Location Dependent Mechanical Behavior of Aponeurosis Tissue Under Uniaxial Tensile Stretch. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Virtual.
- 30.** **Wheatley, B.B.**, Drake, A.M., Fuller, L.H., & Donahue, S.W. (2021). Modeling the Effect of Bighorn Sheep Horn Shape on Post-Impact Accelerations. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Virtual.
- 29.** Mandel, M., Seeley, M., **Wheatley, B.**, Woo, B., Young, A., Fabricant, P. D., & Cornell, M. (2020). Genu Valgum and Obesity in the Pediatric Patient. *American Academy of Pediatric National Conference*. Virtual.
- 28.** Vaidya, A.J. & **Wheatley, B.B.** (2020). Novel Volumetric Compression Relaxation Testing of Skeletal Muscles. *Biomedical Engineering Society Annual Meeting*. Virtual.
- 27.** Gilmore, E.C., Fuller, L.H., Drake, A.M., Aguirre, T.G., Ingrole, A.A., Donahue, S.W., & **Wheatley, B.B.** (2020). Shape Characterization of Bighorn Sheep Horns for Bending and Impact Implications. *Meeting of the American Society of Biomechanics*. Virtual.
- 26.** **Wheatley, B.B.** & Seeley, M.A. (2020). Modeling the Effect of Femoral Anteversion on Knee Extensor Muscle Force and Anterior Knee Mechanics. *Meeting of the American Society of Biomechanics*. Virtual.
- 25.** Mandel, M., Woo, B., Young, A., Fabricant, P., **Wheatley, B.**, Seeley, M. (2020). Genu Valgum and Obesity in the Pediatric Patient. *American Academy of Pediatrics National Conference & Exhibition*. Virtual.
- 24.** Vaidya, A.J. & **Wheatley, B.B.** (2020). Development and Implementation of Volumetric Compression Relaxation Testing of Skeletal Muscle. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Virtual.

- 23. Grega, K.L., Fu, C., & Wheatley, B.B.** (2020). Biaxial Tensile Mechanics of Aponeurosis Tissue. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Virtual.
- 22. Wheatley, B.B. & Fu, C.** (2020). The Role of Biaxial Stretch in Elucidating Passive Muscle Mechanics. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Virtual.
- 21. Wheatley, B.B., Yancey, M.E., & Seeley, M.A.** (2020). A Musculoskeletal-Finite Element Framework for Modeling the Effect of Femoral Anteversion on Knee Extensor Muscle Force and Anterior Knee Mechanics. *CAMS-KNEE OpenSim Workshop and Conference*. Zurich, Switzerland. Poster Award Runner-Up.
- 20. Nester J., Torino D., Sylvestre D., Ney S., Wheatley B.B., Seeley M.** (2019). Risk of Reoperation After Primary ACL Reconstruction in Pediatric Patients. *Eastern Orthopaedic Association Annual Conference*, West Palm Beach, FL.
- 19. Vaidya, A.J. & Wheatley, B.B.** (2019). Effects of Volumetric Boundary Conditions on the Compressive Mechanics and Modeling of Passive Skeletal Muscle. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Seven Springs, PA. BS Level Competition 3rd Place.
- 18. Grega, K. L. & Wheatley, B.B.** (2019). Determination of the Linear Viscoelastic Behavior of Aponeurosis. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Seven Springs, PA.
- 17. Wheatley, B.B., Yancey, M.E., & Seeley, M.A.** (2019) Patellofemoral Contact Mechanics in Nail-Patella Syndrome and High Femoral Anteversion Morphology – Finite Element Modeling. *The Orthopaedic Research Society*. Austin, TX.
- 16. Vaidya, A.J. & Wheatley, B.B.** (2018). Effects of Boundary Conditions on the Stress Relaxation of Passively Compressed Skeletal Muscle. *Biomedical Engineering Society Annual Meeting*. Atlanta, GA.
- 15. Geswell M., Sinha N., Wheatley B.B., Mirenda, W.M. & Seeley M.A.** (2018) Teaching the infant hip exam: A novel approach. *Eastern Orthopaedic Association Annual Conference*. Amelia Island, FL.
- 14. Wheatley, B.B., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L.** (2018). Finite Element Analysis of Intramuscular Pressure in Passive *in Vivo* Human Skeletal Muscle. *World Congress of Biomechanics*. Dublin, Ireland.
- 13. Wheatley, B.B.** (2018). Investigating the Variability of Passively Stretched Skeletal Muscle with a Functional Morphological Fiber Model. *World Congress of Biomechanics*. Dublin, Ireland.
- 12. Wheatley, B.B., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L.** (2017). Finite Element Analysis of Intramuscular Pressure in the Human Tibialis Anterior. *American Society of Biomechanics*. Boulder, CO.
- 11. Wheatley, B.B., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L.** (2017). Finite Element Modeling of Active Skeletal Muscle: Muscle Force and Intramuscular Pressure. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Tucson, AZ. PhD Level Competition Finalist.
- 10. Kaufman, K.R., Go, S. A., O'Connor, S.A., Wheatley, B. B., Litchy, W. J., Haut Donahue, T.L., Odegard, G.M., Ward, S.R., & Lieber, R.L.** (2016). Quantitative Muscle Force Measurement using Intramuscular Pressure. *Biomedical Engineering Society Annual Meeting*. Minneapolis, MN.
- 9. Wheatley, B.B., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L.** (2016). A Novel and

Validated Finite Element Model of Passively Stretched Skeletal Muscle. *European Society of Biomechanics*. Lyon, France.

8. Wheatley, B.B., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2016). Skeletal Muscle Permeability: Direct Experimental Evaluation and Modeling Implications. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. National Harbor, MD.

7. Wheatley, B.B., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2016). Anisotropy and Rigor Effects of Skeletal Muscle. *The Orthopaedic Research Society*. Lake Buena Vista, FL.

6. Wheatley, B.B., Morrow, D.A., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2015). Predicting the Stress and Intramuscular Pressure Response of Whole Skeletal Muscle Through Optimized Finite Element Analysis. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Snowbird Resort, UT.

5. Wheatley, B.B., Pietsch, R., Donahue, T.L., & Williams, L.N. (2015). Numerical Modeling of Skeletal Muscle Under High Strain and Stress Relaxation Compression Conditions. *Summer Biomechanics, Bioengineering, and Biotransport Conference*. Snowbird Resort, UT.

4. Wheatley, B.B., Morrow, D.A., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2014). Inverse Finite Element Analysis for Poroelastic Material Properties of Excised Skeletal Muscle. *World Congress of Biomechanics*. Boston, MA.

3. Drake, A.M., Wheatley, B.B., Kaufman, K.R., & Haut Donahue, T.L. (2014) Hydraulic Permeability of Rabbit Muscle Transverse to Contraction Direction. *Rocky Mountain Regional American Society of Biomechanics*. Estes Park, CO.

2. Wheatley, B.B., Fischenich, K.M., Haut, R.C., & Haut Donahue, T.L. (2014). Mechanical Properties of Healthy and Damaged Menisci through Finite Element Analysis of Indentation. *The Orthopaedic Research Society*. New Orleans, LA.

1. Wheatley, B.B., Morrow, D.A., Odegard, G.M., Kaufman, K.R., & Haut Donahue, T.L. (2013). Poroelastic Material Properties of Skeletal Muscle through Inverse Finite Element Method. *Rocky Mountain Regional American Society of Biomechanics*. Estes Park, CO.

Refereed Conference Papers (primarily engineering pedagogy)

8. Salyards, K.A., Wakabayashi, K., & Kozick, R.J., & Wheatley, B.B. (2024). Longitudinal Assessment of the Achievement of the Desired Goals and Characteristics of a First-Year Engineering Course Redesign. *American Society of Engineering Education*. Portland, OR.

7. Wheatley, B.B., Wakabayashi, K., & Salyards, K.A. (2023). Integration of ethics in sustainability in a first-year design course. *American Society of Engineering Education*. Baltimore, MD.

6. Salyards, K.A., Wakabayashi, K., & Wheatley, B.B. (2022). Redesigning an Introduction to Engineering Course as an Interdisciplinary Project-Based Course. *ASEE First Year Engineering Experience*. East Lansing, MI.

5. Wheatley, B.B. (2020). Appropriate Finite Element Analysis in Mechanical Engineering: Teaching Best Practices Through Simulation. *American Society of Engineering Education*. Virtual.

4. Wheatley, B.B., Miskioglu, E., Christou, E., Tymvios, N. (2020). Pre and Post Tenure: Perceptions of Requirements and Impediments for Mechanical Engineering and Mechanical Engineering Technology Faculty. *American Society of Engineering Education*. Virtual.

3. Buffinton, K. B., Wheatley, B.B., Habibian, S., Shin, J., Cenci, B.H., & Christy, A.E. (2020). Investigating the Mechanics of Human-Centered Soft Robotic Actuators with Finite Element Analysis. *RoboSoft*. Virtual.

2. Wheatley, B.B., Fischenich, K.M., Abrams, L.A., Sorby, S.A., Singh Mali, H., Jain, A.K., & Haut Donahue, T.L. (2017). Improvement of an International Research Experience: Year Two. *American Society of Engineering Education*. Columbus, OH.

1. Wheatley, B.B., Haut Donahue, T.L., & Catton, K.B. (2017). An Active Learning Environment to Improve First-Year Mechanical Engineering Retention Rates and Software Skills. *American Society of Engineering Education*. Columbus, OH.

Books

1. Askeland, D.R., Wright, W.J., & Wheatley, B.B. (2025). The Science and Engineering of Materials, 8th Edition. ISBN: 9798214012087

Google Scholar:

<https://scholar.google.com/citations?user=JOaYOUIAAAAJ&hl=en>

HONORS AND AWARDS

Titles and Fellowships

Invited Visiting Professor	2025
Georges Charpak Institute of Human Biomechanics, Art et Métiers, Paris Tech	
Health Initiative Faculty Fellow	2024 – 2025
Bucknell University	
Visiting Assistant Professor	2019
Stanford University, OpenSim Visiting Scholars Program	
John P. and Mary Jane Swanson Professor of Engineering and the Sciences	2017 – 2020
Bucknell University	
Government of Ireland Postdoctoral Fellowship (Declined)	2017 – 2019
Irish Research Council	
College of Engineering Graduate Teaching Fellowship	2016 – 2017
Colorado State University	

Awards

Excellence in Mentorship and Advising	2025
Bucknell College of Engineering	
Outstanding Contributions to Enhance the Engineering Educational Experience	2024
Bucknell College of Engineering	
Co-Awarded with/ Profs. Kelly Salyards and Kat Wakabayashi	
President's Diversity & Inclusion Award, Faculty	2023
Bucknell University	
Best Poster Runner-Up	2020
CAMS-Knee OpenSim Workshop	
PhD Competition Finalist - Tissue Mechanics and Characterization	2017
Summer Biomechanics, Bioengineering, and Biotransport Conference	

Best Graduate Student Podium Presentation Award Rocky Mountain American Society of Biomechanics	2017
Global Impact Research Top Scholar Colorado State University Graduate Student Showcase	2015
Shrake Culler Scholarship Colorado State University	2015
Joseph L. Guire Memorial Scholarship Colorado State University	2012

Mentee Awards

Marianne Voigt (Bucknell '24) – NSF Grad Research Fellowship
 Allyson Clarke (Bucknell '24) – Goldwater Scholarship, NSF Grad Research Fellowship
 Minhaj Bhuiyan (Bucknell '23) – NSF Grad Research Fellowship
 Ruth Segall (Bucknell '21) – Women in Sports Technology Fellowship (WiST)
 Anurag Vaidya (Bucknell '21) – 3rd Place, SB3C BS Student Paper Competition

GRANTS

Bucknell University – External Grants

- | | |
|---|-------------|
| 9. Pennsylvania Manufacturing Fellows Initiative
<i>Design Optimization for Manufacturing Cost Reduction of a Roll Off Container</i>
Role: co-PI Award Total: \$69,999 (Awarded) | 2025 – 2026 |
| 8. Albertine Foundation – Transatlantic Research Partnership
<i>Developing a Link Between Muscle Microstructural Form and Function - Towards Improved Treatments for Age Related Muscle Impairments</i>
Role: co-PI Award Total: \$20,000 (Awarded) | 2024 – 2026 |
| 7. National Science Foundation
<i>ERI: A Computational and Experimental Approach to Establishing Multiscale and Multiphasic Structure-Function Mechanisms of Muscle Stiffness</i>
Role: PI Award Total: \$216,000 (Awarded – award number 2301653) | 2023 – 2025 |
| 6. Bucknell-Geisinger Research Initiative
<i>Biomechanical characterization of Ponseti Bracing treatment of clubfoot</i>
Role: co-I Award Total: \$20,000 (Awarded) | 2022 – 2023 |
| 5. Bucknell-Geisinger Research Initiative
<i>A new approach to characterizing human motor control architecture for improved stroke rehabilitation</i>
Role: PI Award Total: \$19,738 (Awarded) | 2021 – 2022 |
| 4. Toyota Research Institute
TRI-UM Project: <i>Don't Bite the Hand that Feeds You: Soft Robotics for the Eldercare II</i>
Role: co-PI Subaward Total: \$30,055 (Awarded) | 2019 – 2020 |
| 3. Bucknell-Geisinger Research Initiative
<i>Characterization and Modeling of Miserable Malalignment Syndrome Lower Limb Biomechanics</i>
Role: PI Award Total: \$100,000 (Awarded) | 2019 – 2023 |
| 2. National Science Foundation Major Research Instrumentation | 2018 – 2019 |

Acquisition of a Planar Biaxial Material Testing System for Enhancement of Research and Teaching at Bucknell University

Role: PI Award Total: \$123,789 (Awarded – award number 1828082)

1. Bucknell-Geisinger Research Initiative 2018 – 2019

Computational Modeling of Pediatric High Femoral Anteversion and Knee Biomechanics

Role: PI Award Total: \$19,947 (Awarded)

Bucknell University – Internal Grants

2. Cifolillo Healthcare Technology Inventors Program Project Grant 2023 – 2024

The Design of a Bioinspired Impact Mitigation System Towards the Prevention of Brain Injuries

Role: PI Award Total: \$10,000 (Awarded)

1. Data Generation Grant 2020 – 2023

Mechanisms of Passive Stiffness in Skeletal Muscle

Role: PI Award Total: \$5,000 (Awarded)

Bucknell University – Internal Student Awards

5. Program for Undergraduate Research 2018 – 2025

Role: Research Advisor Award Total: \$3,000 – \$4,500

Total Number Awarded: 14

4. Graduate Student Summer Research Award 2024, 2025

Role: Research Advisor Award Total: \$4,500

Total Number Awarded: 2

3. Emerging Scholars Program 2021, 2022, 2025

Role: Research Advisor Award Total: \$4,000 – \$4,250

Total Number Awarded: 3

2. Costa Research Fund 2021 – 2024

Role: Research Advisor Award Total: \$4,776 – \$6,370

Total Number Awarded: 3

1. Clare Boothe Luce Scholars 2018 – 2021

Role: Research Advisor Award Total: \$4,500 – \$5,000

Total Number Awarded: 3

EXTERNAL INVITED TALKS

6. Institut de Biomécanique Humaine Georges Charpak, Arts et Métiers ParisTech 2025
You Are a Machine! Musculoskeletal Biomechanics Across Length Scales

5. Lehigh University Bioengineering Seminar 2024
You Are a Machine! Musculoskeletal Biomechanics Across Length Scales

4. Geisinger Commonwealth School of Medicine Grand Rounds 2022
From Computation to the Clinic: The Roles of Biomechanics, Modeling, Mentorship, and Collaboration in Orthopaedic Research

3. Institut de Biomécanique Humaine Georges Charpak, Arts et Métiers ParisTech 2021
Structure-Function Mechanisms in Passive Muscle Mechanics

2. Stanford University 2019
OpenSim Visiting Scholars Presentation at Neuromuscular Biomechanics Lab

1. Western Michigan University Mechanical Engineering Seminar 2019
From Computation to the Clinic

TEACHING EXPERIENCE

Bucknell University

ENGR 600 - Engineering Research Design and Methods	2025
MECH 475/675 – Finite Element Modeling	2024, 2025
MECH 353 – Solid Mechanics	2021 – 2023
MECH 302 – Finite Element Analysis	2018, 2019
MECH 401 & 402 – Senior Design	2020, 2021
MECH 471 – Nonlinear Solid Mechanics	2018
ENGR 100 – Engineering Design Experience	2017, 2018, 2020 – 2023
Co-Coordinator and Course Redesign	2020 – 2022, 2024
ENGR 452 & 453 – Interdisciplinary Senior Design	2021 – 2023

Colorado State University

The Institute for Learning and Teaching – Teaching Certificate Program	2016 – 2017
MECH 103 – Introduction to MECH (Graduate Teaching Fellow)	2016 – 2017
MECH 495 – Independent Study, The Jaipur Foot (Graduate Instructor)	2016 – 2017

RESEARCH EXPERIENCE

Bucknell University

Principal Investigator, Mechanics and Modeling of Orthopaedic Tissues Laboratory 2017 – Present

Colorado State University

Graduate Research Assistant, Soft Tissue Mechanics Laboratory 2012 – 2017

480 Biomedical, Inc. (Watertown, MA)

Engineering Intern, Design Team 2011 – 2012

Workshops and Training

Institute for Biomechanics, ETH Zürich	2020
<i>CAMS-Knee OpenSim Workshop</i>	
National Skeletal Muscle Research Center, UCSD	2013
<i>Workshop on Muscle Physiology</i>	

SERVICE TO PROFESSION

Grant Reviewer

National Institutes of Health 2022
Musculoskeletal Rehabilitation Sciences Study Section

Conference Moderator or Session Organizer

Computer Methods in Biomechanics and Biomedical Engineering Symposium
 Summer Biomechanics, Bioengineering, and Biotransport Conference
 American Society of Biomechanics Annual Meeting

European Society of Biomechanics Annual Meeting

Journal Peer Reviewer

Acta Biomaterialia, Journal of Biomechanics, Journal of the Mechanical Behavior of Biomedical Materials, Journal of Biomechanical Engineering, Clinical Biomechanics, IEEE Transactions on Biomedical Engineering, PLOS ONE, Journal of Applied Biomechanics, Cell Reports Physical Science, The Anatomical Record, Sports Medicine – Open, PeerJ

Conference Peer Reviewer

American Society of Biomechanics Annual Meeting
Computer Methods in Biomechanics and Biomedical Engineering Symposium
Summer Biomechanics, Bioengineering, and Biotransport Conference
American Society of Engineering Education Annual Conference
American Society of Biomechanics East Coast Meeting
First-Year Engineering Experience

Outreach and STEM Mentorship Activities

Bucknell Engineering EXCEerator Project Mentor	2024
Bucknell University Engineering Camp Instructor	2024
Bucknell STEM Scholar Mentor	2021
Central Pennsylvania Girls on the Run	
Board Member,	2020 – 2021
Volunteer Coach	2023
Lewisburg Children's Museum Engineering Camp	2019 – 2021
American Society of Biomechanics National Biomechanics Day	2016

Ad Hoc Activities

NASA Virtual Vehicle Assessments and Human Body Modeling Working Group	2025
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SERVICE TO UNIVERSITY

Bucknell University

Department Review Committee Member (4 total)	2024 – Present
Engineering EXCEerator Program Director	2024 – 2027
College of Engineering Curriculum Committee	2024 – 2025
College of Engineering Strategic Initiatives (co-led two initiatives)	2024
Scholarship Day Session Facilitator	2023
Faculty Advisor – Chi Phi Fraternity	2023 – Present
Advisory Committee for the Bucknell Farm	2022 – 2023, 2024 – 2025
Residential Colleges Steering Committee	2021 – 2022
Committee on Campus and Student Life	2021
Working Groups for an Inclusive Engineering Community	2020 – 2022
PRIME Grant Reviewer	2020 – Present
Bucknell-Geisinger Research Initiative Event Presenter	2019, 2021, 2023
NIH Round Table Discussion Panelist	2019
NSF CAREER Grant Writing May Plan Co-Organizer	2019, 2020
MECH Visiting Assistant Professor Search Committee	2018
Team Mentor – Men's and Women's Cross Country	2018 – Present
College of Engineering Graduate Committee	2018 – 2023, 2024 – Present
Chair, 2022 – 2023	

Open House/Family Weekend Presenter

2018 – 2022

Colorado State University

Graduate Student Council, VP of Finance

2015 – 2017

Mechanical Engineering Graduate Ambassador

2016 – 2017

Colorado State University Graduate Showcase Moderator

2015 – 2016

RESEARCH MENTEES**Bucknell University (post-Bucknell position in parentheses)**

Kelsey Brennan – Biomedical Engineering '29

Nihad Jafarov – Mechanical Engineering '28

Obianuju Obumneme-Akaneme – Mechanical Engineering '28

Abysinnia Shiferaw – Mechanical Engineering '28

Bernard Iringire Nkusi – Mechanical Engineering '27

Paige Jackson – Biomedical Engineering '27

Celsey Johnson – Cell Bio/Biochemistry '27

Mahmood Rashedi – Mechanical Engineering MS '26

Adrina Iachini – Mechanical Engineering '26

Amelia Boyd – Mechanical Engineering '25

Julianna Capizzi – Biomedical Engineering '25

Kailey Grainger – Mechanical Engineering '27

Gianni Valentine – Cell Bio/Biochemistry '27

Akinkunmi Peter-Koyi – Cell Bio/Biochemistry '27

Medeline Lehker – Biomedical Engineering '26

Chiara Vessicchio – Mechanical Engineering '26

Bryce Reimer – Mechanical Engineering '24, MS Mechanical Engineering '25

Jose Juarez – Mechanical Engineering '24

Anthony Zamarra – Biomedical Engineering '23 (Catalent Pharma)

Sarah Vestal – Mechanical Engineering '24 (Navy Acquisition Development Program)

Jack Calisi – Psychology '23 (Stony Brook Doctor of Physical Therapy)

Allyson Clarke – Biomedical Engineering '24 (U of Washington PhD Mechanical Engineering)

Marianne Voigt – Biomedical Engineering '24 (Duke PhD Biomedical Engineering)

Kyle Young – Mechanical Engineering '24 (PPL Electric Utilities)

Sabrina Lorza – Mechanical Engineering '23 (Deloitte)

Minhaj Bhuiyan – Biomedical Engineering '23 (Duke PhD Biomedical Engineering)

Jacob Schaefer – Mechanical Engineering '24 (Northrup Grumman)

Jaden Lee – Mechanical Engineering '23 (Westfalia Technologies)

Emily Tully – Mechanical Engineering '21 (Jaros, Baum & Bolles)

Olivia Dyer – Cell Bio/Biochemistry '22 (U of Delaware PhD Biomedical Engineering)

Thomas Matsumura – Neuroscience '22 (Youngstown State Master of Public Health)

Kristen Fu – Mechanical Engineering '20 (UPenn MS Materials Science)

Ruth Segall – Cell Bio/Biochemistry '21 (UPitt MS Bioengineering)

Elyssa Penson – Mechanical Engineering '21 (Boston University PhD Mechanical Engineering)

Anurag Vaidya – Biomedical Engineering '21 (MIT PhD Health Sciences and Technology)

Keith Grega – Biomedical Engineering '21 (Temple Medical School)

Sai Pranav Rallabhandi – Mechanical Engineering '21 (Exelon Nuclear)

Joelle Andres-Beck – Mechanical Engineering '21 (Airline Hydraulics Corporation)

Margo Yancey – Mechanical Engineering '19 (Department of Defense)

Christine Bendzinski – Cell Bio/Biochemistry '18 (Inscripta, Inc.)

Geisinger Musculoskeletal Institute (co-advised)

Olivia Dyer – Pediatric Orthopaedic Research Assistant

Geisinger Commonwealth School of Medicine (co-advised)

Nathan Chacras '25

Calum Wallace '23

John Coulter '23

Sundeep Kahlon '23

Mark Mandel '22

Colorado State University (co-advised)

Aaron Drake – BS, MS, Mechanical Engineering

Alex Tomsick – BS, Mechanical Engineering

Other Institutions (co-advised/collaborations)

Emma Gilmore – Biomedical Engineering '21, UMASS Amherst

Thomas Lavigne – Mechanical Engineering MS '22, PhD, Arts et Métiers ParisTech

Thesis Committees (Bucknell University, unless otherwise noted)

Matt Hockenbrock – MS in Mechanical Engineering '25

Nicholas Vandenberg – PhD in Mechanical Engineering, University of Colorado-Denver '25

Anurag Vaidya – Honors in Computer Science '21

Lucas Rankin – MS in Chemical Engineering '21

Soheil Habibian – MS in Mechanical Engineering '19

PROFESSIONAL MEMBERSHIPS

Penn Center for Musculoskeletal Disorders (Affiliate Member)	2024 – Present
Council for Undergraduate Research	2020 – Present
American Society for Engineering Education	2018 – Present
Orthopaedic Research Society	2018 – Present
American Society of Biomechanics	2014 – Present
European Society of Biomechanics	2016 – Present
American Society of Mechanical Engineers	2012 – Present