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## PROFESSIONAL APPOINTMENTS

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### **Bucknell University (Lewisburg, PA)**

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

### **Geisinger (Danville, PA)**

Apos 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

## EDUCATION

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**Ph.D., Mechanical Engineering** 2017

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

Trinity College (Hartford, CT)

## PUBLICATIONS

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### 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.org: 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**

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., Jason 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 3<sup>rd</sup> 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.

**Google Scholar:**

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

## HONORS AND AWARDS

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### Titles and Fellowships

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

### Awards

Outstanding Contributions to Enhance the Engineering Educational Experience	2024
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Bucknell College of Engineering Co-Awarded w/ Profs. Kelly Salyards and Kat Wakabayashi	
President's Diversity & Inclusion Award, Faculty Bucknell University	2023
Best Poster Runner-Up CAMS-Knee OpenSim Workshop	2020
PhD Competition Finalist - Tissue Mechanics and Characterization Summer Biomechanics, Bioengineering, and Biotransport Conference	2017
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) – 3<sup>rd</sup> Place, SB3C BS Student Paper Competition

### GRANTS

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#### Bucknell University – External Grants

9. National Science Foundation 2025 – 2027  
*Collaborative Research: BioDesign: bovid horncore bone morphology as inspiration for energy absorbing structures*  
 Role: co-PI    Award Total: \$775,166 and Bucknell Total: \$210,864 (Pending)
8. Albertine Foundation – Transatlantic Research Partnership 2024 – 2026  
*Developing a Link Between Muscle Microstructural Form and Function - Towards Improved Treatments for Age Related Muscle Impairments*  
 Role: co-PI    Award Total: \$20,000 (Awarded)
7. National Science Foundation 2023 – 2025  
*ERI: A Computational and Experimental Approach to Establishing Multiscale and Multiphasic Structure-Function Mechanisms of Muscle Stiffness*  
 Role: PI    Award Total: \$216,000 (Awarded – award number 2301653)
6. Bucknell-Geisinger Research Initiative 2022 – 2023  
*Biomechanical characterization of Ponseti Bracing treatment of clubfoot*  
 Role: co-I    Award Total: \$20,000 (Awarded)
5. Bucknell-Geisinger Research Initiative 2021 – 2022  
*A new approach to characterizing human motor control architecture for improved stroke*

*rehabilitation*

Role: PI      Award Total: \$19,738 (Awarded)

**4.** Toyota Research Institute 2019 – 2020

TRI-UM Project: *Don't Bite the Hand that Feeds You: Soft Robotics for the Eldercare II*

Role: co-PI      Subaward Total: \$30,055 (Awarded)

**3.** Bucknell-Geisinger Research Initiative 2019 – 2023

*Characterization and Modeling of Miserable Malalignment Syndrome Lower Limb Biomechanics*

Role: PI      Award Total: \$100,000 (Awarded)

**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.** Ciffolillo 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 – 2024

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

Total Number Awarded: 12

**4.** Graduate Student Summer Research Award 2024

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

Total Number Awarded: 1

**3.** Emerging Scholars Program 2021, 2022

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

Total Number Awarded: 2

**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

**CAMPUS TALKS**

**External Invited Talks**

**4.** Geisinger Commonwealth School of Medicine 2022

- Department of Medical Education Grand Rounds  
*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 2019  
 Department of Mechanical Engineering Seminar  
*From Computation to the Clinic*

## TEACHING EXPERIENCE

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### Bucknell University

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 – Exploring Engineering	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

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<b>Bucknell University</b>	2017 – Present
Principal Investigator, Mechanics and Modeling of Orthopaedic Tissues Laboratory	
<b>Colorado State University</b>	2012 – 2017
Graduate Research Assistant, Soft Tissue Mechanics Laboratory	
<b>480 Biomedical, Inc. (Watertown, MA)</b>	2011 – 2012
Engineering Intern, Design Team	

## SERVICE TO PROFESSION

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### Grant Reviewer

National Institutes of Health	2022
<i>Musculoskeletal Rehabilitation Sciences Study Section</i>	

### Conference Moderator or Session Organizer

Computer Methods in Biomechanics and Biomedical Engineering	2023
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Summer Biomechanics, Bioengineering, and Biotransport Conference	2022
Meeting of the American Society of Biomechanics	2020, 2024

**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**

Computer Methods in Biomechanics and Biomedical Engineering	2023
Summer Biomechanics, Bioengineering, and Biotransport Conference	2017 – Present
American Society of Engineering Education Annual Conference	2016 – Present
American Society of Biomechanics East Coast Meeting	2020, 2023
First-Year Engineering Experience	2022

**Outreach and STEM Mentorship Activities**

Bucknell University Engineering Camp Instructor	2024
Bucknell EXCEerator Project Director	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

**SERVICE TO UNIVERSITY****Bucknell University**

Engineering Curriculum Committee	2024 – 2025
Engineering EXCEerator Project Mentor	2024
Scholarship Day Breakout Session Co-Facilitator	2023
Faculty Advisor – Chi Phi Fraternity	2023 – Present
Advisory Committee for the Bucknell Farm	2022 – 2023
Residential Colleges Steering Committee	2021 – 2022
Committee on Campus and Student Life	2021
Working Groups for an Inclusive Engineering Community	2020 – 2022
Family Appreciation Weekend Virtual Presenter	2020
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	
Admitted Students Open House Presenter	2018, 2019, 2021, 2022

**Colorado State University**

Graduate Student Council, VP of Finance	2015 – 2017
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Mechanical Engineering Graduate Ambassador  
 Colorado State University Graduate Showcase Moderator

2016 – 2017  
 2015 – 2016

## RESEARCH MENTEES

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### **Bucknell University (post-Bucknell position in parentheses)**

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 Zamorra – 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 Masters 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 – B.S., Mechanical Engineering '19 (Department of Defense)  
 Christine Bendzinski – B.S., 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 Chaclas '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**

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

Anurag Vaidya – Honors in Computer Science '21

Lucas Rankin – MS in Chemical Engineering '21

Soheil Habibian – MS in Mechanical Engineering '19

**PROFESSIONAL MEMBERSHIPS**

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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