Reed D. Gurchiek

rgurchiek@gmail.com

EDUCATION

PhD University of Vermont, Mechanical Engineering, 2021
Concentration: Biomechanics
Dissertation: *Towards remote gait analysis: Combining physics and probabilistic models for estimating human joint mechanics*
Committee: Ryan S. McGinnis, PhD, Michael J. Toth, PhD, Bruce D. Beynnon, PhD, Niccolo Fiorentino, PhD

MS Appalachian State University, Engineering Physics, 2018
Concentration: Systems Automation

MS Appalachian State University, Exercise Science, 2017
Thesis: *The use of inertial measurement units to perform kinetic analyses of sprint acceleration and change of direction tasks*
Committee: Herman van Werkhoven, PhD, Jeffrey M. McBride, PhD, Ryan S. McGinnis, PhD, Alan R. Needle, PhD

BS Cumberland University, Exercise Science, 2015
Minor: Mathematics

CURRENT POSITION

Postdoctoral Research Fellow, June 2021 – present
Neuromuscular Biomechanics Lab, Dept. of Bioengineering, Stanford University

RESEARCH & PUBLICATIONS

Peer-Reviewed Journal Articles

In preparation

1. Meyer, BM, **Gurchiek**, **RD**, Tulipani, LJ, Allen, DA, Adamowicz, L, Larie, D, Solomon, AJ, Cheney, N, McGinnis, RS. Analysis of free-living walking bout duration in persons with multiple sclerosis.

Under review

1. **Gurchiek**, **RD**, Donahue, N, Fiorentino, NM, McGinnis, RS. Wearables-only analysis of muscle and joint mechanics: An EMG-driven approach. *IEEE Transactions on Biomedical Engineering*. Under review.

2. McGinnis, EW, O'Leary, A, DiCristofaro, S, **Gurchiek**, **RD**, Copeland, W, McGinnis, RS, 2021. PanicMechanic: A digital therapeutic delivering biofeedback for panic attacks. *IEEE Journal of Biomedical and Health Informatics*. Under review.

3. Potter, MV, Cain, SM, Ojeda, LV, **Gurchiek**, **RD**, McGinnis, RS, Perkins, NC, 2021. Evaluation of error-state Kalman filter method for estimating human lower-limb kinematics during various walking gaits. *PLOS One*. Under review.

4. Zwart, AS, Perez, PS, **Gurchiek, RD**, McBride, JM, 2021. Effect of IMU location on estimation of ground reaction force during jumping. *Sports Biomechanics*. Under review.

Published

5. **Gurchiek, RD**, Beynnon, BD, Agresta, CE, Choquette, RH, McGinnis, RS. Wearable sensors for remote patient monitoring in orthopedics: A narrative review. *Minerva Orthopedics*. Accepted.

6. Potter, MV, Cain, SM, Ojeda, LV, **Gurchiek**, **RD**, McGinnis, RS, Perkins, NC, 2021. Error-state Kalman filter for lower-body kinematic estimation: Evaluation on a 3-body lower-limb model. *PLOS One*, 16(4): e0249577.

7. Meyer, BM, Tulipani, LJ, **Gurchiek**, **RD**, Allen, DA, Adamowicz, L, Larie, D, Solomon, AJ, Cheney, N, McGinnis, RS, 2020. Wearables and deep learning classify fall risk from gait in multiple sclerosis. *IEEE Journal of Biomedical and Health Informatics*, 25(5): 1824-31.

8. Hawley, VS, **Gurchiek, RD**, van Werkhoven, H, 2020. Can foot anthropometry predict vertical jump performance? *Journal of Strength and Conditioning Research*. In press.

9. LeBlanc, B, Hernandez, EM, McGinnis, RS, **Gurchiek, RD**, 2021. Estimating ground reaction force within a mechanical fatigue framework: An application for high mileage runners. *Journal of Biomechanics*. 115(22): 110130.

10. **Gurchiek**, **RD**, Ursiny, AT, McGinnis, RM, 2020. A Gaussian process model of muscle synergy functions for estimating unmeasured muscle excitations using a measured subset. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 28(11): 2478-2487.

11. Dowling, B, Laughlin, WA, **Gurchiek, RD**, Owen, CP, Luera, MJ, Hansen, BR, Fleisig, GS, 2020. Kinematic and kinetic comparison between American and Japanese collegiate pitchers. *Journal of Science and Medicine in Sport*, 23(12): 1202-1207.

12. **Gurchiek, RD**, Garabed, CP, McGinnis, RS, 2020. Gait event detection using a thigh-worn accelerometer. *Gait and Posture*, 80: 214-216.

13. **Gurchiek, RD**, Cheney, N, McGinnis, RS, 2019. Estimating biomechanical time-series with wearable sensors: A systematic review of machine learning techniques. *Sensors*, 19(23): 5227.

14. Adamowicz, L, **Gurchiek, RD**, Ferri, J, Ursiny, AT, Fiorentino, N, McGinnis, RS, 2019. Novel algorithms for estimating relative orientation and hip joint angles from wearable sensors. *Sensors*, 19(23): 5143.

15. **Gurchiek, RD**, Choquette, RH, Beynnon, BD, Slauterbeck, JR, Tourville, TW, Toth, MJ, McGinnis, RS, 2019. Open-source remote gait analysis: A post-surgery patient monitoring application. *Scientific Reports*, 9(1): 17966.

16. Frechette, ML, Meyer, B, Tulipani, L, **Gurchiek, RD**, McGinnis, RS, Sosnoff, JJ, 2019, Next steps in wearable technology and community ambulation in multiple sclerosis. *Current Neurology and Neuroscience Reports*, 19(10): article 80.

17. McGinnis, EW, Anderau, SP, Hruschak, J, **Gurchiek, RD**, Lopez-Duran, NL, Fitzgerald, K, Rosenblum, KL, Muzik, M, McGinnis, RM, 2019. Giving voice to vulnerable children: Machine learning analysis of speech detects anxiety and depression in early childhood. *IEEE Journal of Biomedical and Health Informatics*, 23(6): 2294-2301.

18. **Gurchiek, RD**, Rupasinghe Arachchige Don, HS, Pelawa Watagoda, LCR, McGinnis, RS, van Werkhoven, H, Needle, AR, McBride, JM, Arnholt, AT, 2019. Sprint assessment using machine learning and a wearable accelerometer. *Journal of Applied Biomechanics*, 35(2): 164-169.

19. Rice, PE, **Gurchiek, RD**, McBride, JM, 2018. Physiological and biomechanical responses to an acute bout of high kicking in dancers. *Journal of Strength and Conditioning Research*, 32(10): 2954-2961.

20. **Gurchiek, RD,** McGinnis, RS, Needle, AR, McBride, JM, van Werkhoven, H, 2018. An adaptive filtering algorithm to estimate sprint velocity using a single inertial sensor. *Sports Engineering*, 21(4): 389-399.

21. **Gurchiek, RD,** McGinnis, RS, Needle, AR, McBride JM, van Werkhoven, H, 2017. The use of a single inertial sensor to estimate 3-dimensional ground reaction force during accelerative running tasks. *Journal of Biomechanics*, 61: 263-268.

22. Rice, PE, van Werkhoven, H, Dejournette, DJ, **Gurchiek, RD**, Mackall, JW, McBride, JM, 2017. A comparison of musculo-articular stiffness and maximal isometric plantar flexion and knee extension force in dancers and untrained individuals. *Journal of Dance Medicine and Science*, 21(4): 144-150.

23. Lidstone, DE, Stewart, JA, **Gurchiek, RD,** Needle, AR, van Werkhoven, H, McBride, JM, 2017. Physiological and biomechanical responses to prolonged heavy load carriage during level treadmill walking in females. *Journal of Applied Biomechanics*, 33(4): 248-255.

24. Lidstone, DE, van Werkhoven, H, Stewart, JA, **Gurchiek, RD,** Burris, M, Rice, PE, Feimster, G, McBride, JM, 2016. Medial gastrocnemius muscle-tendon interaction and architecture change during exhaustive hopping exercise. *Journal of Electromyography and Kinesiology*, 30: 89-97.

Peer-Reviewed Conference Articles & Abstracts

1. **Gurchiek, RD**, Meyer, BM, Fox, SR, McGinnis, RS, 2021. RemoteBMX: An open-source software platform for multimodal free-living gait analysis with wearable sensors. Invited symposium talk at the *17th IEEE-EMBS International Conference on Wearable and Implantable Body Sensor Networks*.

2. Fox, S, **Gurchiek**, **RD**, Ursiny, A, Meyer, B, Boughton, J, McGinnis, RS, 2021. Adaptive surface electromyography normalization for long-duration recordings. To be presented at the *17th IEEE-EMBS International Conference on Wearable and Implantable Body Sensor Networks*.

3. **Gurchiek**, **RD**, Donahue, N, Fiorentino, NM, McGinnis, RS. Wearables-only EMG-driven simulation of muscle contraction during gait. To be presented at the *45th Annual Meeting of the American Society of Biomechanics (ASB):* Atlanta, GA, USA, August 2021.

4. Potter, MV, Cain, SM, Ojeda, LV, **Gurchiek**, **RD**, McGinnis, RS, Perkins, NC. Magnetometer-free relative heading correction for IMU-based hip joint angle estimates. *45th Annual Meeting of the American Society of Biomechanics (ASB):* Atlanta, GA, USA, August 2021. Under review.

5. Weed, L, **Gurchiek, RD**, Tulipani, L, Meyer, B, Allen, D, Ursiny, A, Solomon, A, McGinnis, R. Sleep detection and disturbance characterization from chest accelerometer for Multiple Sclerosis. *Annual Meeting of the Biomedical Engineering Society (BMES)*: San Diego, CA, USA, October 2020.

6. Meyer, BM, Tulipani, LJ, **Gurchiek, RD**, Allen, DA, Adamowicz, L, Larie, D, Solomon, AJ, Cheney, N, McGinnis RS. Deep learning to classify fall risk from wearable accelerometer data during standing in persons with multiple sclerosis. *44th Annual Meeting of the American Society of Biomechanics (ASB)*: Atlanta, GA, USA, August 2020.

7. Ursiny, AT, **Gurchiek, RD**, McGinnis, RS. Does sex influence interpretations of control complexity via muscle synergy analysis? *44th Annual Meeting of the American Society of Biomechanics (ASB)*: Atlanta, GA, USA, August 2020.

8. **Gurchiek, RD**, Ursiny, AT, McGinnis, RS. Estimating unmeasured muscle excitations: NNMF vs Gaussian process-based synergy models. *44th Annual Meeting of the American Society of Biomechanics (ASB)*: Atlanta, GA, USA, August 2020.

9. **Gurchiek, RD**, Ursiny, AT, McGinnis, RS. Modeling muscle synergies as a Gaussian process: Estimating unmeasured muscle excitations using a measured subset. *42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*: Montréal, QC, Canada, July 2020.

10. **Gurchiek, RD**, Choquette, RH, Beynnon, BD, Slauterbeck, JR, Tourville, TW, Agresta, CE, Toth, MJ, McGinnis, RS. Data aggregation for digital health: Application to remote gait analysis following knee surgery. *42nd Annual*

International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS): Montréal, QC, Canada, July 2020.

11. **Gurchiek, RD**, Ursiny, AT, McGinnis, RS. Estimating muscle excitations using a reduced sEMG array across a range of walking speeds. *Dynamic Walking*: virtual conference, May 2020.

12. Dowling, B, Camp, C, McElheny, K, Hansen, B, **Gurchiek, RD**, Dines, J. Investigating the Tommy John Twist and its relation to elbow varus torque in professional baseball pitchers. *2019 Annual Meeting of the American Shoulder and Elbow Surgeons (ASES)*: New York, NY, USA, October 2019.

13. Dowling, B, Camp, C, McElheny, K, Hansen, B, **Gurchiek, RD**, Dines, J. Investigating the Tommy John Twist and its relation to elbow varus torque in professional baseball pitchers. *XXVII Congress of the International Society of Biomechanics (ISB) and 43rd Annual Meeting of the American Society of Biomechanics (ASB)*: Calgary, AB, Canada, July 2019.

14. **Gurchiek, RD**, McGinnis, RS, Needle, AR, McBride, JM, van Werkhoven, H. An inertial sensor-based technique for estimating kinetic sprint performance metrics. *XXVII Congress of the International Society of Biomechanics (ISB) and 43rd Annual Meeting of the American Society of Biomechanics (ASB)*: Calgary, AB, Canada, July 2019.

15. **Gurchiek, RD**, Choquette, RH, Beynnon, BD, Slauterbeck, JR, Tourville, TW, Toth, MJ, McGinnis, RS. Wearable sensor-based remote gait analysis detects altered duty factor and phase specific quadriceps muscle activation in patients recovering from ACL reconstruction surgery. *XXVII Congress of the International Society of Biomechanics (ISB) and 43rd Annual Meeting of the American Society of Biomechanics (ASB)*: Calgary, AB, Canada, July 2019.

16. Tulipani, LJ, **Gurchiek, RD**, Warren, H, Adamowicz, L, Solomon, AJ, McGinnis, RS. Wearables demonstrate transition technique relates to balance confidence and fatigue in persons with Multiple Sclerosis. *XXVII Congress of the International Society of Biomechanics (ISB) and 43rd Annual Meeting of the American Society of Biomechanics (ASB)*: Calgary, AB, Canada, July 2019.

17. van Werkhoven, H, Hawley, VS, **Gurchiek, RD**. Can foot anthropometry predict jumping performance in both sexes? *XXVII Congress of the International Society of Biomechanics (ISB) and 43rd Annual Meeting of the American Society of Biomechanics (ASB)*: Calgary, AB, Canada, July 2019.

18. McBride, JM, Perez, PS, **Gurchiek RD**. Estimation of ground reaction force utilizing an IMU placed on different locations of the body during vertical jumping. *24th Annual Congress of the European College of Sport Science (ECSS)*: Prague, CZE, July 2019.

19. McGinnis, RS, **Gurchiek, RD**, Tulipani LJ, Adamowicz, L. An analysis platform for wearable sensor-based remote gait monitoring. *Dynamic Walking 2019*: Canmore, AB, Canada, June 2019.

20. **Gurchiek, RD**, Choquette, RH, Beynnon, BD, Slauterbeck, JR, Tourville, TW, Toth, MJ, McGinnis, RS. Remote gait analysis using wearable sensors detects asymmetric gait patterns in patients recovering from ACL reconstruction. *16th IEEE-EMBS International Conference on Wearable and Implantable Body Sensor Networks (BSN)*: Chicago, IL, USA, May 2019.

21. Tulipani, LJ, Adamowicz, L, **Gurchiek, RD,** Weed, L, Warren, HR, Solomon, AJ, McGinnis, RS. Transitioning assessments from the clinic to daily life: exploring sit-to-stand transition rates as a means for assessing symptom fluctuation. *Americas Committee for Treatment and Research in Multiple Sclerosis (ACTRIMS) Forum*: Dallas, TX, USA, February 2019.

22. **Gurchiek, RD**, Adamowicz, L, Tulipani, LJ, Weed, L, Solomon, AJ, McGinnis, RS. Wearable sensor-based characterization of gait biomechanics in persons with multiple sclerosis: comparing in-lab and daily life observations. *Americas Committee for Treatment and Research in Multiple Sclerosis (ACTRIMS) Forum*: Dallas, TX, USA, February 2019.

23. **Gurchiek, RD**, Rupasinghe Arachchige Don, HS, Pelawa Watagoda, LCR, McGinnis, RS, van Werkhoven, H, Needle, AR, McBride, JM, Arnholt, AT. Sprint assessment using machine learning and a wearable accelerometer. *Gait and Clinical Movement Analysis Society (GCMAS) Annual Conference*: Indianapolis, IN, USA, May 2018.

24. **Gurchiek, RD,** McGinnis RS, Needle, AR, McBride, JM, van Werkhoven, H. An adaptive filtering algorithm to estimate sprint velocity using a single inertial sensor. *41st Annual Meeting of the American Society of Biomechanics*: Boulder, CO, USA, August 2017.

25. **Gurchiek, RD,** McGinnis RS, Needle, AR, McBride, JM, van Werkhoven, H. The use of a single inertial sensor to estimate 3D ground reaction force during accelerative running tasks. *41st Annual Meeting of the American Society of Biomechanics*: Boulder, CO, USA, August 2017.

26. Stewart, JA, Zwetsloot, KA, Rice, PE, Georgescu, VP, Lidstone, D, **Gurchiek, RD**, Capps, SC, and McBride, JM. Mechanical efficiency is decreased after 40-km cycling in trained triathletes. *National Strength and Conditioning Association National Conference*: New Orleans, LA, USA, July 2016.

27. Rice, PE, Lidstone, DE, van Werkhoven, H, Stewart, HA, **Gurchiek, RD**, Burris, ME, Feimster, GW, McBride, JM. Effect of exhaustive hopping on muscle-tendon interaction and architecture. *40th Annual Meeting of the American Society of Biomechanics*: Raleigh, NC, USA, August 2016.

28. **Gurchiek, RD**, Pritchett, CT, van Werkhoven, H. The effect of speed of locomotion and smartphone location on smartphone predicted ground reaction forces. *40th Annual Meeting of the American Society of Biomechanics*: Raleigh, NC, USA, August 2016.

29. **Gurchiek, RD**, Pritchett, CT, van Werkhoven, H. Using smartphone sensors to accurately measure ground reaction forces during physical activity – a feasibility study. *Annual Meeting of the American College of Sports Medicine*: Boston, MA, USA, May 2016.

<u>Other Research Presentations</u>

1. **Gurchiek, RD**. Remote human movement analysis in sports and rehabilitation. Virtual seminar talk (postdoc interview): Stanford University, March 2021.

2. **Gurchiek, RD**. Exercise, rehabilitation, and remote patient monitoring. Invited lecture: University of Vermont, Burlington, VT, USA, October 2020.

3. **Gurchiek, RD**. Combining physics and probabilistic models for simulating muscle contraction. *University of Vermont Mechanical Engineering Seminar:* Burlington, VT, USA, September 2020.

4. **Gurchiek, RD**, Ursiny, AT, McGinnis, RM. Estimating unmeasured muscle excitations using Gaussian process regression. *Student Research Conference*, University of Vermont, USA, April 2020.

5. McGinnis, RS, **Gurchiek, RD**. Development of digital biomarkers for orthopedic, neurological, and mental health conditions. Invited talk: University of Washington, Seattle, WA, USA, December 2019.

6. **Gurchiek, RD**, Choquette, RH, Beynnon, BD, Slauterbeck, JR, Tourville, TW, Toth, MJ, McGinnis, RS. Towards wearable sensor-based remote gait analysis. *McClure Musculoskeletal Research Day*, University of Vermont, Burlington, VT, USA, June 2019.

7. **Gurchiek, RD**, McGinnis, RS. Towards wearable sensor-based remote patient monitoring. *University of Vermont CEMS graduate showcase*, Burlington, VT, USA, May 2019.

8. **Gurchiek, RD**. Wearable sensor methods for characterizing sprint performance. *University of Vermont Mechanical Engineering Seminar*, Burlington, VT, USA, October 2018.

Patents (awarded, submitted, or disclosed)

1. McGinnis, RS, **Gurchiek, RD**. System and Method for Remotely Monitoring Muscle and Joint Function. US 63/187,889, Filed May 12, 2021. *Disclosed while with the University of Vermont*.

SELECTED PRESS

1. CBI Supercharges Healthcare Advancements: UVM's Center for Biomedical Innovation (CBI) is designing and building the future of healthcare. *UVM Communications*, June 2021.

FELLOWSHIPS & GRANTS

Vermont Space Grant Consortium Graduate Fellowship, July 2019 – June 2020
- Title: *Hybrid machine learning and physics-based estimation of human joint mechanics for remote monitoring*

ACADEMIC POSITIONS

Postdoctoral Associate, January 2021 – June 2021
M-Sense Research Group, Dept. of Electrical and Biomedical Engineering, University of Vermont
- Wearables-based remote gait analysis and sleep characterization of children with Duchenne muscular dystrophy
- Remote gait analysis of patients with Huntington's disease and multiple sclerosis
- Instructor for upper-level Biomedical Engineering course in Musculoskeletal System Dynamics

Instructor, January 2021 – May 2021
Dept. of Electrical and Biomedical Engineering, University of Vermont
- BME 296 Musculoskeletal System Dynamics: covers topics in intermediate dynamics applied to the dynamical analysis of the human musculoskeletal system: attitude representations, optimal attitude estimation, Lagrange's equations, forward- and inverse-dynamics of articulated rigid body systems, and computational methods.
- 14 undergraduate & 5 graduate students
- Course evaluations (scale: 1-5, N=17)
    - How much did you learn in this course? 4.53
    - How academically and intellectually challenging was this course? 4.53
    - What was the overall effectiveness of the instructor? 4.41

Graduate Research Assistant, August 2018 – January 2021
M-Sense Research Group, Dept. of Electrical and Biomedical Engineering, University of Vermont
- Designed algorithms for monitoring patients and automated gait analysis in remote environments with wearables in multiple contexts: knee surgery, multiple sclerosis, Huntington's disease, and Duchenne muscular dystrophy
- Developed pipeline for training machine learning-based activity classification algorithms using wearables
- Developed novel probabilistic model of muscle synergy functions that allows estimation of muscle excitations
- Developed software package for wearable sensor or 3D videography-based rigid body dynamics and simulation of muscle contraction dynamics
- Mentored six undergraduate students in research projects including muscle synergy analysis, gait event detection, activity classification, fall risk classification, wearable sensor-based jumping analysis, and modeling muscle activation dynamics.

Graduate Teaching Assistant, August 2018 – December 2018
Dept. of Electrical and Biomedical Engineering, University of Vermont
- EE 100 Electrical Engineering Concepts: sensors, actuators, amplifiers, and active filtering

Guest Lecturer, October 2018
Dept. of Electrical and Biomedical Engineering, University of Vermont
- BME 181 Biomedical Engineering Lab: muscle activation dynamics, electromyography signal processing techniques, proprioception

Adjunct Instructor, June 2018 – July 2018
Dept. of Health Science, South College, Asheville, NC
- PHY 2010/2020 General Physics: vector algebra, 2D linear/angular kinematics/kinetics

Graduate Research Assistant, August 2015 – May 2017
Musculoskeletal Mechanics Laboratory, Dept. of Health & Exercise Science, Appalachian State University, Boone, NC
- Algorithm development for magnetic/inertial sensor-based human movement assessments using physics-based and machine learning techniques
- Muscle-tendon dynamics during stretch shortening cycle activities and the effects of fatigue
- Musculoskeletal structure-function relationships in the ankle joint

Graduate Teaching Assistant, August 2015 – May 2016
Dept. of Health & Exercise Science, Appalachian State University, Boone, NC
- ES 3550 Introduction to Biomechanics Lab: center of mass, electromyography, force plates, biomechanics of jumping

MENTORSHIP EXPERIENCE

Current:
Previous:
- *UVM Senior Experience in Engineering Design*: Nicole Donahue, Cole Garabed, Curtis Ianni, James Doherty
  - Instrumented knee brace
- Anna Ursiny, BS, Biomedical Engineering, UVM
  - Wearables-based sleep characterization
- Cole Garabed, BS, Biomedical Engineering, UVM
  - Task extrapolation of muscle synergy functions
- Nicole Donahue, BS, Biomedical Engineering, UVM
  - Modeling muscle activation, Bayesian optimization of Hill-type muscle model parameters
- Alex West, BS, Biomedical Engineering, UVM
  - Wearable sensor-based jump analysis
- Dakota Allen, BS, Biomedical Engineering, UVM
  - Activity identification
- Anna Ursiny, BS, Biomedical Engineering, UVM
  - Muscle synergy analysis
- Cole Garabed, BS, Biomedical Engineering, UVM
  - Event detection
- Brett Meyer, BS, Biomedical Engineering, UVM
  - Activity identification, gait event detection

PROFESSIONAL ENGINEERING EXPERIENCE

Engineering Consultant, August 2019 – December 2019
University of Washington, Seattle, WA
- Algorithm design for automated running analysis using wearable sensors

Biomechanical Engineer, June 2017 – December 2018
Motus Global, Rockville Centre, NY

- Developed custom software and biomechanical models to automate human movement analysis (inverse dynamics, inverse kinematics, neuromusculoskeletal modeling) using 3D videography, force plate, and/or inertial sensor data across multiple tasks including throwing, walking, running, jumping, and batting.
- R&D of novel motion capture solutions using only accelerometers
- R&D of inertial sensor-based movement screens for ACL injury risk assessment
- Made improvements to the motusQB application for quarterback specific training recommendations
- R&D of adaptive filtering algorithms for improving inertial sensor-based orientation estimation

OTHER PROFESSIONAL EXPERIENCE

Professional Athlete, December 2016 – December 2017
High Country Grizzlies, National Arena League, Boone, NC

- Quarterback

Performance Coach, January 2015 – August 2015
Velocity Sports Performance, Norwood, MA

- Resistance training and Olympic weightlifting instruction
- Designed one-on-one and group strength training programs
- Designed manual for position-specific NFL combine training program
- One-on-one quarterback instructor

Quarterback Coach, March 2011 – December 2014
National Football Academies, Southeast region

- One-on-one quarterback instruction
- Throwing mechanics analysis

AWARDS & HONORS

2020 Graduate Student of the Year, IEEE Green Mountain Section

2020 Mechanical Engineering Graduate Research Award, University of Vermont

2019 McClure Musculoskeletal Research Award, University of Vermont

2019 Best Student Presentation, IEEE International Conference on Wearable and Implantable Body Sensor Networks

2018 Graduate Student Outstanding Thesis Award, Appalachian State University

2017 Domer Research Award, Appalachian State University

2016 Winner of the MC10 Inc. BioStamp RC Fun Run Competition

2016 First Place 3-Minute Thesis Competition, Appalachian State University

2016 Student Research Award, American College of Sports Medicine (ACSM) Biomechanics Interest Group (BIG)

2014 William V. Campbell Trophy Semifinalist, National Football Foundation & College Football Hall of Fame

2013 All Conference Quarterback, Mid-South Conference West 2nd Team

2013 Capital One Academic All District Football Team

2013 All American Strength and Conditioning Athlete of the Year, National Strength and Conditioning Association

2010 6A/5A Tennessee Mr. Football Finalist Quarterback

OTHER SCHOLARLY ACTIVITIES

Member:

- American Society of Biomechanics (ASB), 2016 – Present
- Institute of Electrical and Electronics Engineers (IEEE), 2019 – Present
- American Society of Mechanical Engineers (ASME), 2018 – Present
- IEEE Engineering in Medicine and Biology Society (EMBS), 2020 – Present

Reviewer for:

- *Journal of Biomechanics*
- *IEEE Journal of Biomedical and Health Informatics*
- *Sensors MDPI*
- *Gait & Posture*
- *Journal of Applied Biomechanics*
- *Sports Engineering*
- *Journal of Sports Sciences*
- *International Journal of Sports Science & Coaching*
- *Minerva Orthopedics*