Ryan S. McGinnis, PhD

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CURRENT POSITIONS

Assistant Professor, Dept. Electrical and Biomedical Engineering Director, M-Sense Research Group	University of Vermont	Aug. 2017-Present
Assistant Director, Biomedical Engineering Program	University of Vermont	Aug. 2018-Present
Scientific Advisor	Impellia, Inc.	July 2018-Present
Scientific Advisor	Hx Innovations, Inc.	July 2019-Present
R&D Consultant	Adidas/U. of Washington	July 2019-Present
Co-Founder & CTO	Allostatech, LLC	July 2019-Present
Scientific Advisor	Epicore Biosystems, Inc.	Aug. 2020-Present
Scientific Advisor	Happy Health, Inc.	Aug. 2020-Present
Member of the Board of Advisors	Respirosa, Inc.	Sept. 2020-Present

EDUCATION

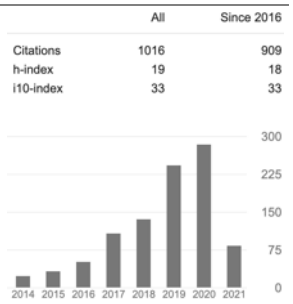
University of Michigan, Post-Doctoral Training — Ann Arbor, MI — April 2013-November 2014
School of Kinesiology; Department of Mechanical Engineering
- Kinesiology Mentors: Scott G. McLean, PhD; Grant C. Goulet, PhD
- Mechanical Engineering Mentor: Noel C. Perkins, PhD

University of Michigan, PhD, MSE — Ann Arbor, MI — September 2009-April 2013
Mechanical Engineering
- Dissertation: Advancing Applications of IMUs in Sports Training and Biomechanics
- Chair: Noel C. Perkins, PhD
- Committee: James Ashton-Miller, PhD; Arthur D. Kuo, PhD; Scott G. McLean, PhD; Mont Hubbard, PhD

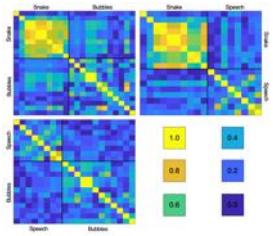
Lafayette College, BS — Easton, PA — September 2005-May 2009
Mechanical Engineering (Summa Cum Laude with Honors)
Study Abroad at Jacobs University — Bremen, Germany — January 2007-May 2007
- Thesis: Golf Club Deflection Characteristics as a Function of the Swing Hub Path
- Advisor: Steven M. Nesbit, PhD

RESEARCH AND PUBLICATIONS

Dr. McGinnis has published 47 papers in peer reviewed journals and 70 in peer reviewed conferences with an additional 6 in review for a total of 122. Many of these studies have been conducted with collaborators across a wide array of disciplines including neurology, physical therapy, psychology/psychiatry, and orthopedics. Additionally, he has filed 10 patents and 3 additional invention disclosure that have been commercialized to form the heart of product offerings from 7 companies (see Research Translation section below). According to Google Scholar, he has a total of 1,016 citations, with an h-index of 19 and an i10-index of 33.

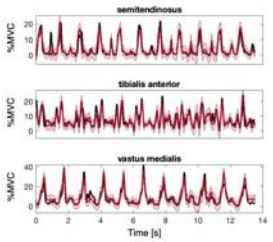


I. Peer Reviewed Journal Articles (appeared or submitted, student mentees underlined)



R1. Weed, L, Little, C, Kasser, SL, **McGinnis, RS.** A Preliminary Investigation of the Effects of Obstacle Negotiation and Turning on Gait Variability in Adults with Multiple Sclerosis. Human Movement Science: Under Review.

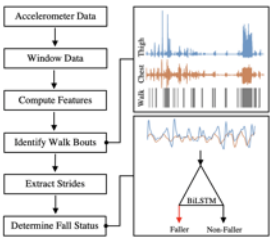
R2. Tulipani, LJ, Meyer, B, Allen, DA, Solomon, AJ, **McGinnis, RS**. Evaluation of unsupervised 30-second chair stand test performance assessed by wearable sensors to predict fall status in multiple sclerosis. Gait & Posture: Under Review.



R3. Little, C, Moore, C, Bean, E, **McGinnis, RS**, Kasser, SL. The Acute Effects of Axial Loading on Postural Control during Walking and Turning in People with Multiple Sclerosis. American Journal of Physical Medicine and Rehabilitation: Under Review.

R4. Gurchiek, RD, Beynnon, BD, Agresta, C, Choquette, RH, **McGinnis, RS.** Wearable sensors for remote patient monitoring in orthopedics: A narrative review. Minerva Orthopedics: Accepted.

R5. Potter, MV, Cain, SM, Ojeda, LV, Gurchiek, RD, **McGinnis, RS**, Perkins, NC. Error-state Kalman Filter for Lower-body Kinematic Estimation: Evaluation on a 3-Body Model. Plos One: Accepted.

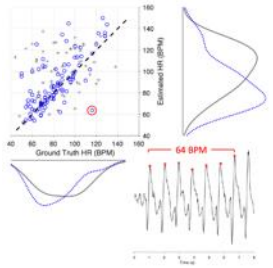


R6. McGinnis, EW, Scism, J, Hruschak, J, Lopex-Duran, NL, Fitzgerald, K, Rosenblum, K, Muzik, M, **McGinnis, RS**. Digital Phenotype for Childhood Internalizing Disorders: Less Positive Play and Promise for a Brief Assessment Battery. IEEE Journal of Biomedical and Health Informatics: Accepted.

R7. LeBlanc, B, Hernandez, EM, Gurchiek, RD, **McGinnis, RS.** Estimating ground reaction force within a mechanical fatigue framework: an application for high mileage runners. Journal of Biomechanics: (2020) 115, 110130.

R8. McClure, K, Erdreich, B, Bates, JHT, **McGinnis, RS**, Masquelin, A, Wshah, S. Classification and Detection of Breathing Patterns with Wearable Sensors and Deep Learning. Sensors: (2020) 20, 6481.

R9. Seel, T, Kok, M, **McGinnis, RS**. Inertial Sensors – Applications and Challenges in a Nutshell. Sensors: (2020) 20, 6221.

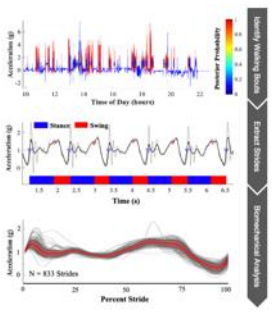


R10. Gurchiek, RD, Ursiny AT, **McGinnis, RS**. Gaussian Process Model of Muscle Synergy Functions for Estimating Unmeasured Muscle Excitations using a Measured Subset. IEEE Transactions on Neural Systems and Rehabilitation Engineering: (2020) 28, 2478-2487.

R11. Vitali, RV, **McGinnis, RS**, Perkins, NC. Robust Error-State Kalman Filter for Estimating IMU Orientation. IEEE Sensors: (2020) 21, 3561-3569.

R12. Meyer, BM, Tulipani, LJ, Gurchiek, RD, Allen, DA, Adamowicz, L, Larie, D, Solomon, AJ, Cheney N, **McGinnis, RS**. Wearables and Deep Learning Classify Fall Risk from Gait in Multiple Sclerosis. IEEE Journal of Biomedical and Health Informatics: (2020) doi: 10.1109/JBHI.2020.3025049.

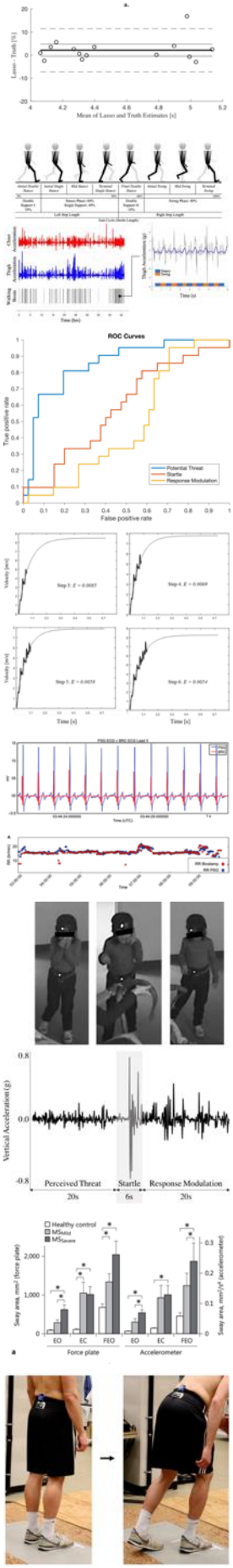
R13. Tulipani, LJ, Meyer, B, Larie, D, Solomon, AJ, **McGinnis, RS**. Metrics extracted from a single wearable sensor during sit-stand transitions relate to mobility impairment and fall risk in people with multiple sclerosis. Gait and Posture: (2020) 80, 361-366.



R14. **McGinnis, RS**, McGinnis, EW, Petrillo, C, Ferri, J, Scism, J, Price, M. Validation of Smartphone Based Heart Rate Tracking for Remote Treatment of Panic Attacks. IEEE Journal of Biomedical and Health Informatics: (2020) doi: 10.1109/JBHI.2020.3001573.

R15. Gurchiek, RD, Garabed, C, **McGinnis, RS**. Gait Event Detection using a Thigh-Worn Accelerometer. Gait and Posture: (2020) 80, 214-216.

R16. Stevens, T, **McGinnis, RS**, Hewgill, B, Tourville, TW, Harvey, J, Toth, MJ, Skalka, C. Rehab Tracker: A Mobile Health System for Monitoring NMES Rehab Compliance. JMIR mHealth and uHealth: (2020) 7, e16605.



R17. Nelms NJ, Birch C, Halsey DH, Blankstein M, **McGinnis RS**, Beynnon BD. Assessment of Early Gait Recovery after Anterior Approach Compared to Posterior Approach Total Hip Arthroplasty: A Smartphone Accelerometer based study. Journal of Arthroplasty: (2020) 35, 465-470.

R18. Gurchiek, RD, Choquette, RH, Beynnon, BD, Slauterbeck, JR, Tourville, TW, Toth, MJ, **McGinnis, RS**. Open-Source Remote Gait Analysis: A Post-Surgery Patient Monitoring Application. Nature Scientific Reports: (2019) 9, 17966.

R19. Gurchiek, RD, Cheney, N, **McGinnis, RS**. Estimating biomechanical time-series with wearable sensors: A systematic review of machine learning techniques. Sensors: (2019) 19, 5227.

R20. Adamowicz, L, Gurchiek RD, Ursiny, AT, Ferri, J, **McGinnis, RS**. Novel Algorithms for Estimating Relative Orientation and Hip Joint Angles from Wearable Sensors. Sensors: (2019) 19, 5143.

R21. Frechette, ML, Meyer, B, Tulipani, L, Gurchiek, RD, **McGinnis, RS**, Sosnoff, JJ. Next steps in wearable technology and community ambulation in multiple sclerosis. Current Neurology and Neuroscience Reports: (2019) 19, 80.

R22. McGinnis, EW, Anderau, S, Hruschak, J, Gurchiek, RD, Lopez-Duran, NL, Fitzgerald, K, Rosenblum, K, Muzik, M, **McGinnis, RS**. Giving Voice to Vulnerable Children: Machine Learning Analysis of Speech Detects Anxiety and Depression in Early Childhood. IEEE Journal of Biomedical and Health Informatics: (2019) 23, 2294-2301. *(Altmetric Attention Score of 201 is in the top 1% of all articles ever tracked and is the second highest score for any article ever published in this journal)*

R23. Gurchiek, RD, Rupasinghe, H, Lasanthi W, **McGinnis, RS**, Arnholt, AT. Sprint Assessment using Machine Learning and a Wearable Accelerometer. Journal of Applied Biomechanics: (2019) 35, 164-169.

R24. **McGinnis, RS**, McGinnis, EW, Hruschak, J, Lopez-Duran, NL, Fitzgerald, K, Rosenblum, K, Muzik, M. Rapid Detection of Internalizing Diagnosis in Young Children Enabled by Wearable Sensors and Machine Learning. PLoS One: (2019) 14, e0210267. *(Altmetric Attention Score of 222 is in the top 1% of all articles ever tracked and in the top 1% of all articles of similar age)*

R25. Sun, R, **McGinnis, RS**, Sosnoff, JJ. Novel Technology for Mobility and Balance Tracking in Patients with Multiple Sclerosis: A Systematic Review. Expert Reviews in Neurotherapeutics: (2018) 18, 887-898.

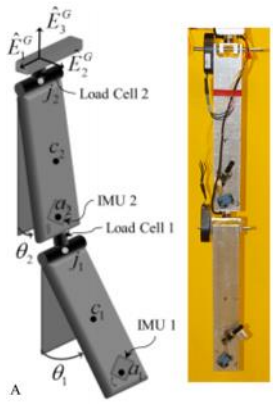
R26. Gurchiek, RD, **McGinnis, RS**, McBride, JM, Needle, A, van Werkhoven, H. An Adaptive Filtering Algorithm to Estimate Sprint Velocity Using a Single Inertial Sensor. Journal of Sports Engineering: (2018) 21, 389-399.

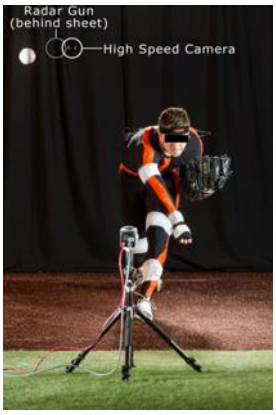
R27. Jortberg, E, Silva, I, Bhatkar, V, **McGinnis, RS**, Sen-Gupta, E, Morey, B, Pindado, J, Wright, J, Bianchi, M. A novel adhesive biosensor system for detecting respiration, cardiac, and limb movement signals during sleep: validation with polysomnography. Nature and Science of Sleep: (2018) 10, 397-408.

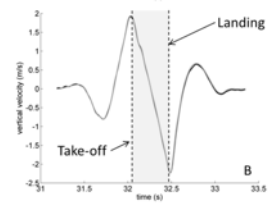
R28. **McGinnis, RS**, McGinnis, EW, Hruschak, J, Ip, K, Morlen, D, Lawler, J, Lopez-Duran, NL, Fitzgerald, K, Rosenblum, KL, Muzik, M. Wearable Sensors Detect Childhood Internalizing Disorders During Mood Induction Task. PLoS One: (2018) 13, e0195598.

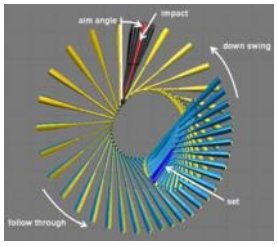
R29. Sun, R, Moon, Y, **McGinnis, RS**, Seagers, K, Motl, RW, Sheth, N, Wright, JA, Ghaffari, R, Sosnoff, JJ. Assessment of postural sway in individuals with multiple sclerosis using a novel wearable inertial sensor. Digital Biomarkers: (2018) 2, 1-10.

R30. Vitali, RV, Cain, SM, **McGinnis, RS**, Zaferiou, A, Ojeda L, Davidson, SP, Perkins, NC. Method for Estimating Three-Dimensional Knee Rotations Using Two Inertial Measurement Units. Sensors: (2017) 17, 1970. *Selected as the Featured Paper in this issue.*









R31. Gurchiek, RD, **McGinnis, RS**, McBride, JM, Needle, A, van Werkhoven, H. Use of a Single Inertial Sensor to Estimate 3-Dimensional Ground Reaction Force during Accelerative Running Tasks. Journal of Biomechanics: (2017) 61, 263-268.

R32. **McGinnis, RS**, McGinnis, EW, Muzik, M, Hruschak, J, Lopex-Duran, NL, Perkins, NC, Fitzgerald, K, Rosenblum, K. Movements indicate threat response phases in children at-risk for anxiety. IEEE Journal of Biomedical and Health Informatics: (2017) 21, 1460-1465.

R33. **McGinnis, RS**, Mahadevan, N, Moon, Y, Seagers, K, Sheth, N, DiCristofaro, S, Silva I, Jortberg, E, Wright, J, Ceruolo, M, Pindado, JA, Ghaffari, R, Patel, S. A Machine Learning Approach for Gait Speed Estimation using Skin-mounted Wearable Sensors: From Healthy Controls to Individuals with Multiple Sclerosis. PLoS One: (2017) 12, e0178366.

R34. Moon, Y, **McGinnis, RS**, Motl, RW, Seagers, K, Sheth, N, Wright, J, Ghaffari, R, Sosnoff, JS. Monitoring of Gait in Multiple Sclerosis with Novel Wearable Motion Sensors. PLoS One: (2017) 2, e0171346.

R35. **McGinnis, RS**, Hough, J, Perkins, NC. Accuracy of wearable sensors for estimating joint reactions. ASME Journal of Computational and Nonlinear Dynamics: (2017) 12, 041010.

R36. **McGinnis, RS**, Cain, SM, Davidson, SP, Vitali, RV, Perkins, NC, McLean, SG. Inertial Sensor and Cluster Analysis for Discriminating Agility Run Technique and Quantifying Changes across Load. Biomedical Signal Processing and Control: (2017) 32, 150-156.

R37. Davidson, SP, Cain, SM, **McGinnis, RS**, Vitali, RV, Perkins, NC, McLean, SG. Quantifying Warfighter Performance in a Target Acquisition and Aiming Task using Wireless Inertial Sensors. Journal of Applied Ergonomics: (2016) 56, 27-33.

R38. Cain SM, **McGinnis RS**, Davidson SP, Vitali RV, Perkins NC, McLean SG. Quantifying performance and effects of load carriage during a challenging balancing task using an array of wireless inertial sensors. Gait & Posture: (2016) 43, 65-69.

R39. **McGinnis, RS**, Cain, SM, Davidson, SP, Vitali, RV, Perkins, NC, McLean, SG. Quantifying the Effects of Load Carriage and Fatigue under Load on Sacral Kinematics during Countermovement Vertical Jump with IMU-based Method. Journal of Sports Engineering: (2016) 19, 21-34.

R40. Whiteside, D, **McGinnis, RS**, Deneweth, JM, Zernicke, RF, Goulet, GC. Ball flight kinematics, variability and pitching success in elite baseball. Scandinavian journal of medicine & science in sports: (2016) 26, 256-265.

R41. **McGinnis, RS**, Cain, SM, Tao, S, Whiteside, D, Goulet, GC, Gardner, EC, Bedi, A, Perkins, NC. Validation of a Novel IMU-based Three-dimensional Hip Angle Measurement in Diagnostic Tests for Femoroacetabular Impingement. IEEE Transactions on Biomedical Engineering: (2015) 62, 1503-1513.

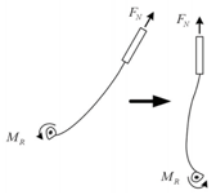
R42. Nesbit, SM, **McGinnis, RS**. Kinetic Constrained Golf Swing Optimization. Journal of Sports Science and Medicine: (2014) 13, 859–873.

R43. **McGinnis, RS**, Perkins, NC. Inertial Sensor Based Method for Identifying Ball Joint Center of Rotation. Journal of Biomechanics: (2013) 46, 2546-2549.

R44. **McGinnis, RS**, Perkins, NC. A Highly Miniaturized, Wireless Inertial Measurement Unit for Characterizing the Dynamics of Pitched Baseballs and Softballs. Sensors: (2012) 12, 11933-11945.

R45. **McGinnis, RS**, Perkins, NC, King, KW. Reconstructing Free-flight Angular Velocity from Miniaturized Wireless Accelerometer. ASME Journal of Applied Mechanics: (2012) 79, 041013:1–041013:9.

R46. King, KW, Hough, J, **McGinnis, RS**, Perkins, NC. A New Technology for Resolving the Dynamics of a Swinging Bat, Journal of Sports Engineering: (2012) 15, 41-52.



R47. Nesbit, SM, **McGinnis, RS**. Biomechanical Study of the Golf Swing Using a Full Body Computer Model, Journal of Applied Golf Research: (2011).
R48. King, KW, Perkins, NC, Churchill, H, **McGinnis, RS**, Doss, R, Hickland, R. Bowling Ball Dynamics Revealed by Miniature Wireless MEMS Inertial Measurement Unit, Journal of Sports Engineering: (2010) 13, 95-104.
R49. **McGinnis, RS**, Nesbit, SM. Golf Club Deflection Characteristics as a Function of the Swing Hub Path, Open Sports Sciences Journal: (2010) 3, 155-164.
R50. Nesbit, SM, **McGinnis, RS**. Kinematic Analysis of the Golf Swing Hub Path and its Role in Golfer/Club Kinetic Transfers. Journal of Sports Science and Medicine: (2009) 8, 235 - 246.

II. Peer Reviewed Conference Articles/Abstracts (student mentees underlined)

C1. 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 2021: Under Review.
C2. Gurchiek, RD, Donahue, N, Fiorentino, N, **McGinnis, RS**. Wearables-only EMG-Driven Simulation of Muscle Contraction During Gait. 45th Annual Meeting of the American Society of Biomechanics 2021: Under Review.
C3. McGinnis, EW, Scism, J, Hruschak, J, Fitzgerald, K, Rosenblum, K, Muzik, M, Copeland, W, **McGinnis, RS**. Promise for a ten-minute assessment battery for childhood anxiety and depression using wearable sensors. Technology in Psychiatry Summit 2020: Online due to COVID-19, October 2020.
C4. Weed, L, Gurchiek, RD, Tulipani, LJ, Meyer, BM, Allen, DA, Ursiny, AT, Solomon, AJ, **McGinnis, RS**. Sleep Detection and Disturbance Characterization from Chest Accelerometer for Multiple Sclerosis. BMES 2020: Online due to COVID-19, October 2020.
C5. 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 2020: Online due to COVID-19, August 2020.
C6. 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 2020: Online due to COVID-19, August 2020.
C7. Gurchiek, RD, Ursiny, AT, **McGinnis, RS.** Reconstructing unmeasured muscle excitations: Comparing NNMF and novel Gaussian process-based synergy models. 44th Annual Meeting of the American Society of Biomechanics 2020: Online due to COVID-19, August 2020. *Selected for a student registration award.*
C8. Gurchiek, RD, Choquette, RH, Beynnon, BD, Slauterbeck, JR, Agresta, C, Tourville, TW, Toth, MJ, **McGinnis, RS**. Data aggregation in digital health: Application to remote gait analysis following knee surgery. Conference for the IEEE Engineering in Medicine and Biology Society EMBC'20: Online due to COVID-19, July 2020.
C9. Hewgill, B, **McGinnis, RS**, Frolik, J. A Low-Cost Modular Health Monitoring Garment. Conference for the IEEE Engineering in Medicine and Biology Society EMBC'20: Online due to COVID-19, July 2020.
C10. Gurchiek, RD, Ursiny, AT, **McGinnis, RS.** Modeling muscle synergies as a Gaussian process: Estimating unmeasured muscle activations using a measured subset. Conference for the IEEE Engineering in Medicine and Biology Society EMBC'20: Online due to COVID-19, July 2020.
C11. Doiron, AL, **McGinnis, RS**, Fiorentino, N, Uriarte, JJ, Bates, JHT. Work in Progress: A Vertically-Integrated, Project-Focused Approach to Undergraduate Bio-medical Engineering Education. 2020 ASEE Annual Conference and Exposition: Online due to COVID-19, June 2020.
C12. Erdreich BH, McClure K, Masquelin A, **McGinnis RS**, Wshah S, Bates JHT. Using wearable sensors and deep learning to categorize and detect different patterns of breathing in healthy subjects. ATS 2020: Online due to COVID-19, May 2020.
C13. Lin, BH, Kamdar, BB, Pavini, MT, Ardren, SS, Burns, S, Bates, JHT, **McGinnis, RS**, Menon, P, Pandian, V, Elfsten, E, Colantuoni, E, Needham, DM, Stapleton, RD. Pilot feasibility study of a novel

restraint device in critically ill patients with acute respiratory failure. ATS 2020: Online due to COVID-19, May 2020.

C14. Gurchiek, RD, Ursiny, AT, **McGinnis, RS**. Estimating muscle excitations using a reduced sEMG array across a range of walking speeds. Dynamic Walking 2020: Online due to COVID-19, May 2020.

C15. Robinson, J, Goodwin, L, Fulk, G, Borland, R, Weed, L, **McGinnis, RS**. Implementing High Intensity Gait Training to Improve Recovery Following Stroke using Knowledge Translation. APTA CSM 2020: Denver, CO, February 2020.

C16. Nelms NJ, Birch C, Halsey DH, Blankstein M, **McGinnis RS**, Beynnon BD. Assessment of Early Gait Recovery after Anterior Approach Compared to Posterior Approach Total Hip Arthroplasty: A Smartphone Accelerometer based study. 2019 AAHKS Annual Meeting: Dallas, TX, November 2019.

C17. Tulipani, L, Gurchiek, RD, Adamowicz, L, Warren, HR, Solomon, AJ, **McGinnis, RS.** Wearables demonstrate transition technique relates to balance confidence and falls in persons with multiple sclerosis. 9th International Symposium on Gait and Balance in Multiple Sclerosis: Technology for Assessment and Intervention: Aurora, CO, October 2019. *Selected for a registration award as one of the top 5 abstracts submitted by a trainee.*

C18. Tulipani, L, Gurchiek, RD, Adamowicz, L, Warren, HR, 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 / 43rd Annual Meeting of the American Society of Biomechanics 2019: Calgary, AB, August 2019.

C19. 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 / 43rd Annual Meeting of the American Society of Biomechanics 2019: Calgary, AB, August 2019.

C20. 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 / 43rd Annual Meeting of the American Society of Biomechanics 2019: Calgary, AB, August 2019.

C21. **McGinnis, RS**, Gurchiek, RD, Adamowicz, L, Tulipani, L. An Analysis Platform for Wearable Sensor-Based Remote Gait Monitoring. Dynamic Walking 2019: Canmore, AB, June 2019.

C22. Gurchiek, RG, 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. IEEE Conference on Body Sensor Networks 2019: Chicago, IL, May 2019. *Selected as best student presentation and for a NSF registration award.*

C23. **McGinnis, RS**, McGinnis, EW, Petrillo, CJ, Price, M. Mobile Biofeedback Therapy for the Treatment of Panic Attacks: A Pilot Study. IEEE Conference on Body Sensor Networks 2019: Chicago, IL, May 2019.

C24. Tulipani, L, Adamowicz, L, Warren, HR, Gurchiek, RD, Weed, L, 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: Dallas, TX, February 2019. *Selected for a student registration award.*

C25. Gurchiek, RD, Adamowicz, L, Tulipani, L, Weed, L, Solomon, AJ, **McGinnis, RS.** Wearable sensor-based characterization of gait biomechanics in patients with multiple sclerosis: Comparing in-lab and daily life observations. Americas Committee for Treatment and Research in Multiple Sclerosis: Dallas, TX, February 2019.

C26. Xia, K, Adamowicz, L, Weed, L, Duksta, C, Barnhart, G, Solomon, A, **McGinnis, RS**. Gait Kinematics and Muscle Activity from Wearable Sensors Associated with Disability in Persons with Multiple Sclerosis. BMES 2018: Atlanta, GA, October 2018.

C27. Weed, L, Petrillo, C, Adamowicz, L, **McGinnis, RS**. Effect of EMS Loading Configuration On Stair Ascent and Descent Biomechanics Using a Kalman Filter and Wearable Inertial Sensors. BMES 2018: Atlanta, GA, October 2018.

C28. Meyer, B, Cain, SM, Perkins, NC, **McGinnis, RS**. Predicting Vertical Ground Reaction Forces During Jumping from Wearable Sensor Data. BMES 2018: Atlanta, GA, October 2018.
C29. Scism, J, McGinnis, EW, Hruschak, J, Lopex-Duran, NL, Fitzgerald, K, Rosenblum, K, Muzik, M, **McGinnis, RS**. Wearables and Bubbles: Identifying Young Children with Internalizing Disorders. BMES 2018: Atlanta, GA, October 2018.
C30. Adamowicz, L, **McGinnis, RS**. Unscented Kalman Filter For Estimating Knee Joint Flexion Axis Using Wearable Sensors. BMES 2018: Atlanta, GA, October 2018.
C31. Adamowicz, L, **McGinnis, RS**. Using Gyroscopic Measurements to Compare Spinal Twisting Angles Experienced During Walking, Running, and Cross-Country Skiing. BMES 2018: Atlanta, GA, October 2018.
C32. Weed, L, Robinson, J, Goodwin, LB, **McGinnis, RS**. Open-Source Wearable Sensor Based Method Feasible for Tracking Steps in Patients Recovering from Stroke. BMES 2018: Atlanta, GA, October 2018.
C33. **McGinnis, RS**, McGinnis, EW, Hruschak, J, Lopex-Duran, NL, Fitzgerald, K, Rosenblum, K, Muzik, M. Rapid Anxiety and Depression Diagnosis in Young Children Enabled by Wearable Sensors and Machine Learning. Conference for the IEEE Engineering in Medicine and Biology Society EMBC'18: Honolulu, HI, July 2018.
C34. Kasser, SL, Ahern, K, Triquet, T, Hindsdale, K, **McGinnis, RS**. Effects of Cognitive Motor Interference on the Neural Control System Underlying Mobility in Adults with Multiple Sclerosis. Annual Meeting of the Consortium of Multiple Sclerosis Centers 2018: Nashville, TN, May 2018.
C35. Gurchiek, RD, Rupasinghe, H, Lasanthi W, **McGinnis, RS**, Arnholt, AT. Sprint Assessment using Machine Learning and a Wearable Accelerometer. Gait and Clinical Movement Analysis Society 2018: Indianapolis, IN, May 2018.
C36. **McGinnis, RS**, McGinnis, EW, Hruschak, J, Lopex-Duran, NL, Fitzgerald, K, Rosenblum, K, Muzik, M. Wearable Sensors and Machine Learning Diagnose Anxiety and Depression in Young Children. IEEE Conference on Biomedical and Health Informatics 2018: Las Vegas, NV, March 2018.
C37. **McGinnis, RS**, Redrado, JB, Choquette, RH, Beynnon, BD, Slauterbeck, JR, Tourville, TW, Toth, MJ. Wearable Sensors Capture Differences in Muscle Activity and Gait Patterns During Daily Activity in Patients Recovering from ACL Reconstruction. IEEE Conference on Body Sensor Networks 2018: Las Vegas, NV, March 2018.
C38. Weed, L, **McGinnis, RS**. Validation of Gait Analysis Pro App for 10m Walk Test. BMES 2017: Phoenix, AZ, October 2017.
C39. Gurchiek, RD, **McGinnis, RS**, McBride, JM, Needle, A, van Werkhoven, H. The Use of a Single Inertial Sensor to Estimate 3-Dimensional Ground Reaction Force during Accelerative Running Tasks. 41st Annual Meeting of the American Society of Biomechanics: Boulder, CO, August 2017.
C40. Gurchiek, RD, **McGinnis, RS**, McBride, JM, Needle, A, 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, August 2017.
C41. **McGinnis, RS**, DiCristofaro, S, Mahadevan, N, Sen-Gupta, E, Silva I, Jortberg, E, Wright, J, Ghaffari, R, Aranyosi, AJ, Patel, S. Longitudinal Data from Wearable Sensor System Suggests Movement Improves Standing Posture. 41st Annual Meeting of the American Society of Biomechanics: Boulder, CO, August 2017.
C42. **McGinnis, RS**, McGinnis, EW. Active Learning in Biomechanics Using Wearable Sensors: A Case Study From The University Of Vermont. 41st Annual Meeting of the American Society of Biomechanics: Boulder, CO, August 2017.
C43. **McGinnis, RS**, DiCristofaro, S, Sen-Gupta, E, Mahadevan, N, Silva I, Jortberg, E, Wright, J, Murphy, B, McGrane, B, Raj, M, Ceruolo, M, Pindado, JA, Ghaffari, R, Patel, S. Longitudinal Posture and Activity Tracking in the Home Enabled by Machine Learning and a Conformal, Wearable Sensor System. SB^{3}C 2017: Tucson, AZ, June 2017.
C44. Sun, R, Moon, Y, **McGinnis, RS**, Seagers, K, Motl, RW, Sheth, N, Wright, JA, Ghaffari, R, Sosnoff, JJ. A Soft, Flexible Skin-Mounted Sensor for Monitoring Balance Deficits in People with Multiple Sclerosis. 2017 CMSC Annual Meeting: New Orleans, LA, May 2017.

C45. Johnson, AM, Etter, JE, Petrillo, CJ, Chen, W, Nuzzolo, J, **McGinnis, RS**. Wearable Sensors Show That Talking, Not Texting, Impairs Postural Control. 43rd Annual Northeast Bioengineering Conference: New Jersey Institute of Technology, March 2017.

C46. Moon, Y, **McGinnis, RS**, Seagers, K, Motl, RW, Sheth, N, Wright, J, Ghaffari, R, Sosnoff, JS. Monitoring Gait in Multiple Sclerosis with Novel Wearable Motion Sensors. 2016 American Congress of Rehabilitation Medicine Annual Conference: Chicago, IL, October 2016.

C47. Silva, I, **McGinnis, RS**, Patel, S, DiCristofaro, S, Mahadevan, N, Jortberg, E, Ceruolo, M, Pindado, J. Development and cloud deployment of machine learning models for heartbeat classification on data from wearable devices. 3rd International Conference on Predictive Applications and APIs (PAPIs '16): Boston, MA, October 2016.

C48. **McGinnis, RS**, Patel, S, Silva, I, Mahadevan, N, DiCristofaro, S, Jortberg, E, Ceruolo, M, Aranyosi, AJ. Skin Mounted Accelerometer System for Measuring Knee Range of Motion. Conference for the IEEE Engineering in Medicine and Biology Society EMBC'16: Orlando, FL, August 2016.

C49. Patel, S, **McGinnis, RS**, Silva, I, DiCristofaro, S, Mahadevan, N, Jortberg, E, Franco, J, Martin, A, Raj, M, McGrane, B, DePetrillo, P, Aranyosi, AJ, Ceruolo, M, Pindado, J, Ghaffari, R. A wearable computing platform for the development and deployment of cloud-based machine learning models for health monitoring. Conference for the IEEE Engineering in Medicine and Biology Society EMBC'16: Orlando, FL, August 2016.

C50. **McGinnis, RS**, McGinnis, EW, Fitzgerald, K, Muzik, M, Perkins, NC, Rosenblum, KL. Startle Response as a Biomarker for Mental Health Risk in Preschoolers. Grand Rounds at the University of Michigan, Psychiatry Department symposium: Can we predict risk of developing a mental illness? Ann Arbor, MI, November 2015.

C51. **McGinnis RS**, Cain SM, McLean SG, Davidson SP, Vitali RV, Perkins NC. Inertial Sensor and Cluster Analysis for Discriminating Agility Run Technique. 9th IFAC Symposium on Biological and Medical Systems. Berlin, September 2015.

C52. **McGinnis RS**, Cain SM, Davidson SP, Vitali RV, McLean SG, Perkins NC. Wearable Inertial Sensor for Agility Run Performance Assessment. ASME IDETC/CIE 2015. Boston, MA, August 2015.

C53. McLean SG, Cain SM, **McGinnis RS**, Davidson SP, Vitali RV, Perkins NC. Quantifying Field-Based Warfighter Performance via a Body-Worn Array of Wireless Inertial Sensors. American Society of Biomechanics. Columbus, OH, August 2015.

C54. Cain SM, **McGinnis RS**, Davidson SP, Vitali RV, McLean SG, Perkins NC. Quantifying Performance and Effects of Load Carriage During Completion a Window Obstacle Using an Array of Wireless Inertial Sensors. American Society of Biomechanics. Columbus, OH, August 2015.

C55. Deneweth, J, **McGinnis, RS**, Zernicke, R, Goulet, G. Individual-specific determinants of successful adaptation to minimal and maximal running shoes. Footwear Biomechanics Symposium. Liverpool, UK, July 2015.

C56. Davidson SP, **McGinnis RS**, Vitali RV, Cain SM, Perkins NC, McLean SG. Validating Inertial Measurement Units as a Method for Determining Rifle Aiming Performance. International Society of Biomechanics. Glasgow, Scotland, July 2015.

C57. Cain SM, **McGinnis RS**, Davidson SP, Vitali RV, McLean SG, Perkins NC. Quantifying Performance and Effects of Load Carriage during a Challenging Balancing Task using an Array of Wireless Inertial Measurement Units. International Society of Biomechanics. Glasgow, Scotland, July 2015.

C58. **McGinnis, RS**, Cain, SM, Davidson, SP, Vitali, RV, McLean, SG, Perkins, NC. Validation of Complementary Filter Based IMU Data Fusion for Tracking Torso Angle and Rifle Orientation. 2014 ASME International Mechanical Engineering Congress and Exposition, November 14-20, Montreal, QC.

C59. Fox, A, Davidson, S, **McGinnis, R**, Cain, S, Saunders, N, & McLean, S. Exploring the use of wireless inertial measurement units for biomechanical analysis of side-step cutting manoeuvres. 2014 Australian Conference of Science and Medicine in Sport, October 15-18, Canberra, Australia.

C60. Cain, SM, **McGinnis, RS**, Davidson, SP, Vitali, RV, Perkins, NC, McLean, SG. Using Inertial Measurement Units to Quantify Gait Performance. Dynamic Walking 2014, June 10-13, Zurich, Switzerland.

C61. Whiteside, D, **McGinnis, RS**, Deneweth, JM, Holstad, R, Martini, DN, Zernicke, RF, & Goulet, GC. Relating ball flight characteristics, variability in release location and game success in elite baseball pitchers. XIX Annual Congress of the European College of Sport Science, July 2-5, 2014, Amsterdam, Netherlands.

C62. **McGinnis, RS**, Cain, SM, Davidson, SP, Vitali, RV, McLean, SG, Perkins, NC. Validation of IMU-based Method for Tracking Warfighter Torso Angle during Up-down Maneuver. 7th World Congress of Biomechanics, July 6-11, 2014, Boston, MA.

C63. **McGinnis, RS**, Cain, SM, Davidson, SP, Vitali, RV, McLean, SG, Perkins, NC. Validation of IMU-based Method for Tracking Warfighter Motion during Jumping Maneuver. 7th World Congress of Biomechanics, July 6-11, 2014, Boston, MA.

C64. Cain, SM, **McGinnis, RS**, Davidson, SP, Vitali, RV, McLean, SG, Perkins, NC. An IMU-based method for quantifying gait: algorithm development and comparisons to motion capture and instrumented treadmill data. 7th World Congress of Biomechanics, July 6-11, 2014, Boston, MA.

C65. Davidson, SP, **McGinnis, RS**, Cain, SM, Vitali, RV, McLean, SG, Perkins, NC. Validating Inertial Measurement Units as a Method for Determining Rifle Aiming Performance. 7th World Congress of Biomechanics, July 6-11, 2014, Boston, MA.

C66. Vitali, RV, **McGinnis, RS**, Cain, SM, Davidson, SP, McLean, SG, Perkins, NC. Quantifying Rifle Aiming Dynamics with an Inertial Measurement Unit. 7th World Congress of Biomechanics, July 6-11, 2014, Boston, MA.

C67. Fox, A, Cain, SM, **McGinnis, RS**, Davidson, SP, Vitali, RV, Perkins, NC, McLean, SG. Ability of body worn inertial measurement units to detect changes in performance during a loaded step-up task. American Society of Biomechanics 2014 Midwest Regional Meeting, March 4-5, Akron, OH.

C68. **McGinnis, RS**, Hough, J, Perkins, NC. Benchmarking the Accuracy of Inertial Measurement Units for Estimating Joint Reactions. Proceedings 2013 ASME International Mechanical Engineering Congress and Exposition, San Diego, CA. IMECE2013-63303. *Selected for best paper award, ASME Bioengineering Division: Biomedical and Biotechnology Engineering*

C69. Hough, J, **McGinnis, RS**, Perkins, NC. Benchmarking the Accuracy of Inertial Measurement Units for Estimating Kinetic Energy. Proceedings 2013 ASME International Mechanical Engineering Congress and Exposition, San Diego, CA. IMECE2013-63300.

C70. **McGinnis, RS**, Perkins, NC. Pitcher Training Aided by Instrumented Baseball. 9th Conference of the International Sports Engineering Association (ISEA), Lowell, MA. Published in Procedia Engineering: (2012) 34, 580-585.

C71. **McGinnis, RS**, Perkins, NC, King, KW. Miniaturized Wireless IMU Enables Low-Cost Baseball Pitching Training Aid. 35th Annual Meeting of the American Society of Biomechanics, Long Beach, CA, August 10-13, 2011.

C72. **McGinnis, RS**, Nesbit, SM. Analysis or the Swing Hub of the Golf Shot. 13th European College of Sports Science Congress, Estoril, Portugal, July 9-12, 2008.

III. Non-Reviewed Conference Articles/Abstracts (student mentees underlined)

NR1. Weed, L, Robinson, J, Goodwin, LB, **McGinnis, RS**. Step Identification in Wearable Sensor Data from Irregular Gait in Stroke Patients. UVM Student Research Conference, Burlington, VT, April 2018.

NR2. Johnson, AM, Etter, JE, Petrillo, CJ, Chen, W, Nuzzolo, J, **McGinnis, RS**. Wearable Sensors Show That Talking, Not Texting, Impairs Postural Control. UVM Student Research Conference, Burlington, VT, April 2017.

NR3. Jednak, C, Adamowicz, L, Walton, M, Roberge, C, Redrado, JB, Parker, M, Bao, J, **McGinnis, RS**. Characterizing Walking, Jogging, and Sprinting Gait Parameters with Wearable Sensors. UVM Student Research Conference, Burlington, VT, April 2017.

NR4. Weed, L, **McGinnis, RS**. Validation of GaitAnalysisPro Mobile Application for Characterizing 10 m Walk Test. UVM Student Research Conference, Burlington, VT, April 2017.

NR5. Scism, J, **McGinnis, RS**. Wearable Sensors and Template Analysis for Automatically Detecting Jump Landings in Sport. UVM Student Research Conference, Burlington, VT, April 2017.

IV. Book Chapters

B1. Raj, M, Patel, S, Lee, CH, Ma, Y, Banks, A, **McGinnis, RS**, McGrane, B, Morey, B, Model, JB, DePetrillo, P, Sheth, N, Liu, C, Sen-Gupta, E, Klinker, L, Murphy, B, Wright, JA, Aranyosi, AJ, Mansour, M, Dorsey, RE, Slepian, M, Huang, Y, Rogers, JA, Ghaffari, R. Multifunctional Epidermal Sensor System with Ultrathin Encapsulation Packaging for Health Monitoring In *Stretchable Bioelectronics for Medical Devices and Systems:* Springer, 2016.

V. Patents (Awarded, Submitted, or Disclosed)

P1. **McGinnis, RS**, Gurchiek, RD. Instrumented Knee Brace for Personalizing Physical Rehabilitation. Disclosed to UVM Innovations September 11, 2020. *(Disclosed while with the University of Vermont)*

P2. **McGinnis, RS**, Meyer, B, Cheney, N, Solomon, AJ. Methods and Apparatus for Quantifying Fall Risk. Disclosed to UVM Innovations May 5, 2020. *(Disclosed while with the University of Vermont)*

P3. **McGinnis, RS**, McGinnis, EW. Methods and Apparatus for Providing Personalized Biofeedback for the Treatment Of Panic Attacks. US 62/681,926, Filed June 7, 2018. *(Filed while with the University of Vermont)*

P4. **McGinnis, RS**, McGinnis, EW, Muzik, M, Rosenblum, K, Fitzgerald, K, Lopez-Duran, N, Hruschak, J. Wearable Sensors and Machine Learning for Diagnosing Anxiety and Depression in Young Children. Disclosed to UVM Innovations November 22, 2017. *(Disclosed while with the University of Vermont)*

P5. Raj, M, **McGinnis, RS**. Closed Loop Respiratory Monitoring System for Sleep Quality Characterization. US 62/415,255, Filed October 31, 2016. PCT/US2017/059210, Filed May 03, 2018. *(Filed while with MC10, Inc.)*

P6. Ghaffari, R, Patel, S, Raj, M, **McGinnis, RS**. Method and System for Neuromodulation and Stimulation. US 15/286,129, Filed October 5, 2016. *(Filed while with MC10, Inc.)*

P7. Pindado, JA, Ceruolo, MC, Patel, SP, **McGinnis, RS**, DePetrillo, P. Method and System for Crowd-Sourced Algorithm Development. US 15/272,816, Filed September 22, 2016. *(Filed while with MC10, Inc.)*

P8. Patel, SP, **McGinnis, RS**, Prakash, A, Ghaffari, R, Raj, M, Silva, A, Jortberg, E. Automated detection and configuration of wearable devices based on on-body status, location, and/or orientation. US 15/048,576, Filed February 19, 2016. *(Filed while with MC10, Inc.)*

P9. **McGinnis, RS**, Perkins, NC, Copple, BR. IMU Array for Assessing Proper Head and Torso Posture during Physical Impact in Sport. US 61/931,767, Filed January 27, 2014. PCT/US2015/012857 Filed January 26, 2015. Awarded February 5, 2019. *(Filed while with the University of Michigan)*

P10. **McGinnis, RS**, Perkins, NC. Athlete Speed Prediction Method Using Data from Attached Inertial Measurement Unit. US Patent 9,213,889, Filed March 25, 2014, Awarded December 15, 2015. *(Filed while with the University of Michigan)*

P11. **McGinnis, RS**, Perkins, NC. Ball Joint Center Locating Method Using Data from Attached Inertial Measurement Unit. US 61/694,790, Filed August 30, 2012. PCT/US2013/057303, Filed August 29, 2013, Awarded January 12, 2018. *(Filed while with the University of Michigan)*

P12. **McGinnis, RS**, Perkins, NC. Pitcher Training Apparatus and Method Using a Ball with an Embedded Inertial Measurement Unit. US Patent 9,032,794. PCT/US2013/053556, Filed August 5, 2013, Awarded May 19, 2015. *(Filed while with the University of Michigan)*

P13. Perkins, NC, King, KW, and **McGinnis, RS**. Apparatus and Methods for Employing Miniature IMU's for Deducing Forces and Moments on Bodies. US 13/236,728, Filed September 20, 2011. *(Filed while with the University of Michigan)*

VI. Invited Talks

I1. **McGinnis, RS**. Development of digital biomarkers, phenotypes, and therapeutics for orthopedic, neurological, and mental health conditions. Oregon Health & Science University (OHSU), September 2021.

I2. **McGinnis, RS.** Inaugural Near-Peer Stories of American Society of Biomechanics (ASB) Early Career Faculty. Hosted online by ASB Early Career Faculty Affinity Group and ASB Student Chapters, April 2021.
I3. **McGinnis, RS**. Update on UVM Center for Biomedical Innovation. UVM CEMS Board of Advisors Annual Meeting, April 2021.
I4. **McGinnis, RS**. Collaboration between UVM's M-Sense Research Group and NIH National Institute of Biomedical Imaging and Bioengineering (NIBIB) DigitalTwin National Center for Biomedical Imaging and Bioengineering (NCBIB). NIBIB NCBIB P41 Site Visit, Washington State University, March 2021. *See additional information about the P41 mechanism and NCBIBs here.*
I5. **McGinnis, RS.** Advances in remote patient monitoring – moving beyond simple measures of physical activity. University of Florida, March 2021.
I6. **McGinnis, RS**. Development of digital biomarkers, phenotypes, and therapeutics for orthopedic, neurological, and mental health conditions. University of Wisconsin - Milwaukee, March 2021.
I7. **McGinnis, RS**. Improving rural healthcare delivery with digital health technologies. Northern New England Clinical & Translation Research Network, February 2021.
I8. **McGinnis, RS**. Best practices for developing wearable sensor algorithms for remote tracking of patients with balance and mobility impairment. University of Michigan, October 2020.
I9. **McGinnis, RS**, Fox, S. Workshop on the Development of Digital Health Technologies. Essex STEM Academy, September 2020.
I10. **McGinnis, RS,** Gurchiek, RD. Development of digital biomarkers for orthopedic, neurological, and mental health conditions. University of Washington, December 2019.
I11. **McGinnis, RS**. Development of digital biomarkers for orthopedic, neurological, and mental health conditions. Biomedical Engineering Seminar, University of Connecticut, November 2019.
I12. **McGinnis, RS**. Wearables and the digital health revolution. Biomedical Engineering Seminar, Brown University, October 2019.
I13. **McGinnis, RS**. Appreciating the People in a STEM Education. CEMS Graduation Invocation, May 2019.
I14. Skalka, C, Clemins, P, Brisson, M, **McGinnis, RS**. Mobile and Network Security for At-Home Health Monitoring. H-ISAC / UVM Medical Device Security Workshop, May 2019.
I15. **McGinnis, RS**. Digital Health Technologies for People with Neurological Disease. Vermont Parkinson's Awareness Day, April 2019.
I16. **McGinnis, RS**. Improving Health with Wearable and Mobile Technologies. Symposium on Complexity in Health and Wellness Behavior, September 2018.
I17. **McGinnis, RS,** McGinnis, EW. Wearable Sensors for Improving Mental Health Assessment in Young Children. Burlington Healthcare Innovators Show & Tell, November 2017.
I18. **McGinnis, RS**. Machine Learning with Sensor Data. Lord MicroStrain Sensing Systems, November 2017.
I19. **McGinnis, RS**. Project Based Learning in First Year Introduction to Biomedical Engineering Design. Meeting of the UVM CEMS Board of Advisors, October 2017.
I20. **McGinnis, RS**. M-Sense Group @ UVM: Research Update. Meeting of the UVM CEMS Board of Advisors, October 2017.
I21. **McGinnis, RS**. Wearable Sensors: From Furthering Fitness to Diagnosing Disease. Burlington Data Science Meet-up, Vermont Tech Jam 2017, BTV Ignite Innovation Week 2017, October 2017.
I22. **McGinnis, RS**. Engineering at the Intersection of Wearable Technology and Improving Human Health and Performance. Meeting of the Student Chapter of BMES at the University of Vermont, April 2017.
I23. **McGinnis, RS**. The Path from Mechanical Engineering to Improving Human Health and Performance with Wearable and Mobile Technologies. Meeting of the Student Chapter of ASME at the University of Vermont, March 2017.
I24. **McGinnis, RS**. Improving Human Health and Performance with Wearable and Mobile Technologies. University of Vermont, February 2017.
I25. **McGinnis, RS**. Conservation of angular momentum: An experimental demonstration of rotation axis precession enabled by a wireless inertial measurement unit. Intermediate Dynamics, University of Michigan, Fall 2013.

I26. **McGinnis, RS**. Conservation of angular momentum: An experimental demonstration of rotation axis precession enabled by a wireless inertial measurement unit. Intermediate Dynamics, University of Michigan, Fall 2012.

VII. Selected Press

[Childhood depression, anxiety diagnosable by algorithm]
AI in Healthcare May 7, 2019

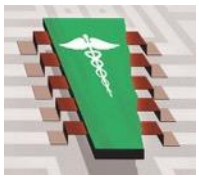
[How AI Can Detect Children with Anxiety and Depression]
Psychology Today May 8, 2019

[Biomedical Engineering Students Dive into Research]
UVM Communications March 6, 2018

[Wearable sensor may help screen for anxiety and depression in kids]
Mashable January 16, 2019

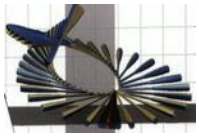
[Revolution in Wearable Devices Prompts New Medical Innovations]
WCAX October 24, 2017

[Wearables could help diagnose disorders in children earlier]
WIRED January 18, 2019



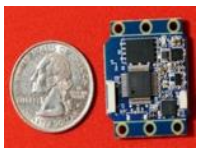
[How Vermont Became a Hotbed for Health Tech Companies]
Seven Days October 18, 2017

[UVM Study helps pinpoint anxiety, depression in young children]
WCAX January 21, 2019



[A Sporting Chance]
Mechanical Engineering Magazine July 2011.

[Why it's key to identify preschoolers with anxiety and depression]
Science News February 3, 2019.



[Pitcher Training Aided by Instrumented Baseball]
Advances in Engineering September 28, 2012

[Wearable Sensor Detects Anxiety, Depression in Young Children]
R&D Magazine January 17, 2019

[PanicMechanic app could help Americans with panic attacks]
CBS News April 29, 2020

[Taking Control: A New Vermont-Made App Helps Users Manage Panic Attacks]
7-Days May 6, 2020

VIII. Participation in Funded Research and Grant Submissions @ UVM (Funded Applications Only)

In support of his research agenda, Dr. McGinnis has secured $1,430,768 across 10 grants as PI and helped to secure a $1,860,704 grant as Co-I. Support has come from federal (NIH, NSF), state (Vermont Department of Economic Development), university, and industry (MC10, Inc., Epicore Biosystems) sources and includes a Trailblazer award from the NIH and a CAREER award from NSF.

1. Title: CAREER: Platform for Characterizing Transdiagnostic Markers of Disease from Wearable and Mobile Technologies
   Agency: NSF (CAREER Award)
   Role: Principal Investigator
   Year Awarded: 2021
   Year (Inclusive) of Project: 2021-2026
   Amount: $500,000

2. Title: Epicore Gait Project
   Agency: Epicore Biosystems
   Role: Principal Investigator
   Year Awarded: 2020
   Year (Inclusive) of Project: N/A - Unrestricted Lab Gift
   Amount: $34,219

3. Title: PanicMechanic: A Mobile Application for Treating Panic Attacks Wherever and Whenever They Occur
   Agency: State of Vermont UVM Ventures Fund (Vermont Department of Economic Development)
   Role: Principal Investigator
   Year Awarded: 2019
   Year (Inclusive) of Project: 2019-2020
   Amount: $55,000 (direct only)

4. Title: Development of Open-source Algorithms for Removing Motion Artifact from Wearable PPG
   Agency: Epicore Biosystems
   Role: Principal Investigator
   Year Awarded: 2019
   Year (Inclusive) of Project: N/A - Unrestricted Lab Gift
   Amount: $17,000

5. Title: Gait Analysis on a Dataset Collected from Subjects with Huntington's Disease
   Agency: MC10, Inc.
   Role: Principal Investigator
   Year Awarded: 2019
   Year (Inclusive) of Project: 2019-2020
   Amount: $93,549

6. Title: Just-In-Time Fall Prevention: Development of an mHealth Intervention for Persons with Multiple Sclerosis
   Agency: NIH/NIBIB (Trailblazer Award)
   Role: Principal Investigator
   Year Awarded: 2019 (Overall Impact Score: 33-Initial, 11-Resubmission)
   Year (Inclusive) of Project: 2019-2022
   Amount: $624,000

7. Title: Development and Pilot Testing of a mHealth Intervention for Reducing Mobility Impairment in People with Parkinson's Disease
   Agency: UVM Binter Research Grant Program
   Role: Principal Investigator
   Year Awarded: 2018
   Year (Inclusive) of Project: 2018-2019
   Amount: $24,000 (direct only)

8. Title: Wearable Sensor System for Quantifying Fall Risk During Daily Life in Persons with Multiple Sclerosis
   Agency: UVM Biomedical Engineering Pilot Program
   Role: Principal Investigator
   Year Awarded: 2018
   Year (Inclusive) of Project: 2018-2019

Amount: $50,000 (direct only)

9. Title: Novel Arm Restraint for Critically Ill Patients to Reduce Immobility, Sedation, Agitation and Cognitive Impairment
   Agency: NIH/NIA (STTR)
   Role: Co-Investigator
   Year Awarded: 2018
   Year (Inclusive) of Project: 2018-2020
   Amount: $1,860,704

10. Title: Assessing Feasibility of PanicMechanic: A Biofeedback App for Treating Panic Attacks
    Agency: University of Vermont Office of the Vice President of Research EXPRESS Program.
    Role: Principal Investigator
    Year Awarded: 2017
    Year (Inclusive) of Project: 2018
    Amount: $3,000 (direct only)

11. Title: Wearable Sensors for Tracking Fall Risk During Daily Activity in Persons with Multiple Sclerosis
    Agency: University of Vermont Movement Disorder Clinic Pilot Program
    Role: Principal Investigator
    Year Awarded: 2017
    Year (Inclusive) of Project: 2017-2018
    Amount: $30,000 (direct only)

IX. Peer Review Activity

- Manuscript Review for (Selected):
  Nature Scientific Reports, PLoS One, IEEE Transactions on Neural Systems & Rehabilitation Engineering, IEEE Transactions on Biomedical Engineering, IEEE Journal of Biomedical and Health Informatics, Journal of Biomechanics, Bone and Joint Research, Biomedical Signal Processing and Control, Journal of Sports Engineering, BioMedical Engineering OnLine, BMC Sports Science, Medicine & Rehabilitation, Sports, Sensors, Biomechanics specialty area of Frontiers in Bioengineering and Biotechnology.
- Grant Review:
  - NIH Special Emphasis Panel on Mobile Health Technologies and Outcomes (March, 2021)
  - NSF DARE Ad-Hoc Reviewer (January, 2021)
  - NIH/NICHD CHHD-K Study Section Ad-Hoc Reviewer (October, 2020)
  - NSF SenSE Panel Reviewer (August, 2020)
  - NIH/NICHD NCMRR Early Career Award R03 Special Emphasis Panel Reviewer (June, 2020)
  - NIH/NICHD CHHD-K Study Section Ad-Hoc Reviewer (July, 2020)
  - NIH Special Emphasis Panel on Mobile Health Technologies and Applications (March, 2020)
  - NASA TRISH Panel Reviewer (2019)
  - Health Research Board of Ireland (2019)
  - Vermont Genetics Network Faculty Research Grant Program (2019, 2020)
  - NIH/NIBIB P41 Onsite Review at Stanford University (2018)
  - MS Australia Research Grant Program (2018)
  - National Multiple Sclerosis Society Research Grant Program (2018)
  - VT EPSCoR SBIR/STTR Phase (0) (2017)

X. Other Research Related Activities

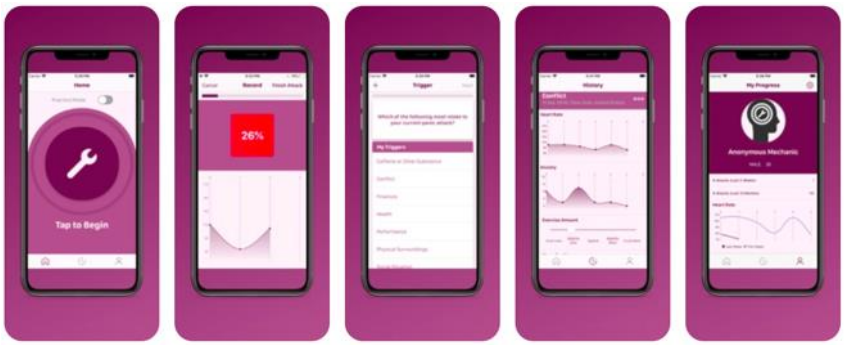
- Faculty Advisor, UVM Center for Biomedical Innovation
- Member, Executive Leadership Council for the University of Vermont Center on Aging

- Member, UVM Orthopaedic Research Committee
- Co-Chair, Northern New England Chapter of IEEE Engineering in Medicine and Biology Society
- Faculty Advisor, University of Vermont Student Chapter of IEEE Engineering in Medicine and Biology Society
- Professional Membership: IEEE – Institute of Electrical and Electronics Engineers, ASME – American Society of Mechanical Engineers, ASB – American Society of Biomechanics
- Conference session chair for: 2018 IEEE EMBC, 2015 IFAC BMS; 2015 ASME IDETC; 2013, 2014 ASME IMECE
- Technical Committee Member IEEE International Conference on Biomedical and Health Informatics (2019).
- Guest Editor Sensors Special Issue on Inertial Sensors (2019)
- Guest Editor Sensors Special Issue on the Application of Wearables in Digital Medicine (2020)
- Associate Editor IEEE Engineering in Medicine and Biology Conference (2021)

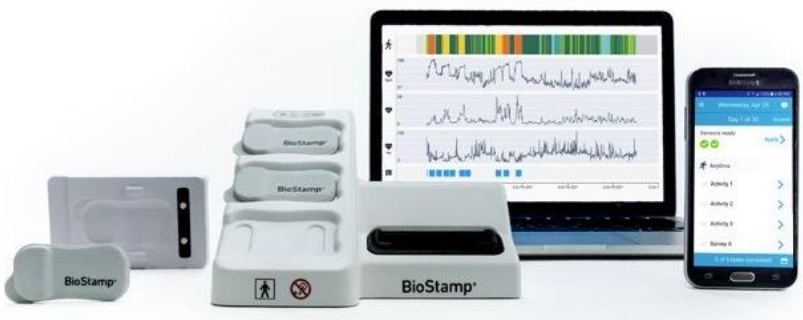
RESEARCH TRANSLATION

Dr. McGinnis' research has been translated into the market where it makes direct impact on the lives of people across the world. The products listed below were developed directly by Dr. McGinnis, companies he has worked with, or companies that have licensed his technologies.

PanicMechanic - Allostatech, LLC
An interactive app that uses concepts from biofeedback to help users manage their panic attacks. Provides in-vivo monitoring of physiological arousal during attacks and longitudinal tracking of potential panic attack triggers and mediators. Dr. McGinnis is co-founder and CTO of Allostatech, LLC, and led development of PanicMechanic.



BioStamp nPoint - MC10, Inc.
FDA 510(k) cleared medical device designed to collect medical grade, clinical quality bio-metric, physiological and eCOA data. Dr. McGinnis led development of the algorithms that translate raw data from the sensors into recognizable clinical measures including vital signs, activity and posture classification, sEMG, and sleep. The MC10 BioStamp business has been acquired by Medidata.



Wilson X - Wilson Sporting Goods
Undetectable sensors provide objective data to inform elite football and basketball player development. Dr. McGinnis' IP was licensed from the University of Michigan in support of this product.

iTrainer Mini – iTrainer Golf Ltd.
The world's smallest and most accurate golf shaft sensor is designed to improve your golf swing. The sensor fits just under your grip and records your key swing parameters during the swing, in real-time. Dr. McGinnis developed the computational algorithms used to translate raw data from the sensor into accurate measure of golf swing performance.

Swing + Pitch Tracker - Diamond Kinetics
Undetectable sensors provide objective data to inform elite baseball and softball player development. Dr. McGinnis' IP was licensed from the University of Michigan in support of this product.

Prairi - Impellia
A comprehensive system that captures movement, biometric, nutrition, and injury data on the field and off and leverages cloud-based data analytics for optimizing performance and recovery. Dr. McGinnis developed algorithms that support core functionality of the system and serves as a scientific advisor for the company.

X Golf School - Jacobs 3D Golf
An evidence-based approach to golf instruction that leverages the latest approaches from biomechanics research to improve your golf swing. Dr. McGinnis worked with Mike Jacobs, a Golf Digest Top 50 Best Teacher, to translate his findings relative to the biomechanics of the golf swing into actionable golf instruction.

PREVIOUS ACADEMIC APPOINTMENTS AND POSITIONS

Lecturer — University of Vermont — August 2016-May 2017
Dept. Electrical and Biomedical Engineering
Dept. Mechanical Engineering

Responsible for creating a new program in Biomedical Engineering, developing and teaching courses in Mechanical, Electrical, and Biomedical Engineering, managing graduate student instructors and undergraduate course graders, mentoring senior capstone design project teams and student research projects, advising undergraduate students, and contributing to a biomedical teaching laboratory renovation project.

Postdoctoral Research Fellow — University of Michigan — May 2013-November 2014
School of Kinesiology; Dept. of Mechanical Engineering

Research Aims:

- Develop and validate inertial sensor based techniques for monitoring warfighter biomechanics

- Develop and validate inertial sensor based techniques for quantifying hip motion during common clinical assessments used for diagnosis of FAI and other morphological abnormalities of the pre-arthritic hip.
- Develop and validate inertial sensor based techniques for quantifying flexible golf club behavior for club fitting and skill assessment.
- Explore and quantify the relationships between baseball and softball windup and delivery kinematics, pitch release conditions, and pitcher skill and effectiveness.
- Determine how running mechanics and economy, and the potential for successful running gait adaptation, are impacted by explicit individualized morphological indices.
- Improve student engagement in Introductory Dynamics and Vibrations course using inertial sensor based concept demonstrations and projects.

Doctoral Student — University of Michigan — September 2009-April 2013
(NSF and ME Dept. Graduate Research Fellow)
Dept. of Mechanical Engineering

Research Aim: Develop and validate inertial sensor based algorithms in the following applications:

- Reconstruct free-flight angular velocity data from accelerometer measurements
- Assess dynamics of pitched baseballs and softballs for skill assessment, and training
- Quantify joint reaction forces and moments
- Identify ball-joint center of rotation in a mechanical analog to the human hip joint
- Estimate athlete speed using a single, torso-mounted inertial measurement unit

Undergraduate Research Assistant — Lafayette College — September 2009-May 2009
Dept. of Mechanical Engineering

Research Aim: Explore the relationship between hand path during the golf swing and club deformation.

EXCEL Scholar — Lafayette College — May 2008-August 2008
Dept. of Mechanical Engineering

Research Aim: Explore the relationship between hand path during the golf swing and various swing parameters.

RESEARCH MENTORSHIP EXPERIENCE

Current:

Degree	Student	Area	Location	Degree	Student	Area	Location
PhD	Lindsey Tulipani	BME	UVM	BS	Anna Ursiny	BME	UVM
PhD	Sam Fox	BME	UVM	BS	Dakota Allen	BME	UVM
PhD	Brett Meyer	CSDS	UVM	BS	Alex West	BME	UVM
AMP	Nicole Donahue	BME	UVM	BS	Abby Teixeira	BME	UVM
AMP	Connor Joyce	EE	UVM	BS	Claire Leahy	BME	UVM
AMP	Connor Harrigan	BME	UVM	BS	Julianne Boughton	BME	UVM
BS	Cole Garabed	BME	UVM	BS	Anna Jane Brown	BME	UVM
BS	Aaron Wynmor	Psych	UVM	BS	Anna Beccia	BME	UVM

Former:

Degree	Student	Area	Year	Current Employment
PhD	Reed Gurchiek	ME/BME	2021	Post Doc, Stanford
PhD	Rachel Vitali	ME	2019	Assistant Professor, University of Iowa
PhD	Jennifer Etter	ME	2018	Lab Manager, Harvard Medical School
MD	Aaron Gelinne	MD	2019	Neurosurgery Resident, UNC Health
MS	Jordyn Scism	BME	2020	Technical Services Specialist, Medtronic
MS	Blake Hewgill	EE	2020	Senior Engineer, General Dynamics
MS	Lukas Adamowicz	ME	2019	Data Science Manager, Pfizer
MS	Daniel Berenberg	CS	2018	Flatiron Institute
MS	Tim Stevens	CS	2018	PhD Student, UVM

BS	Lara Weed	BME	2020	PhD Student, Stanford
BS	Rose Warren	BME	2020	PhD Student and NSF Graduate Research Fellow, UCLA
BS	Dale Larie	BME	2020	Data Scientist, UVM Medical Center
BS	Isaac Downs	BME	2020	Student
BS	Miles Welbourn	BME	2020	TBD
BS	Connor Harrigan	BME	2019	Student
BS	Jon Ferri	BME	2020	TBD
BS	Kailey Bell	BME	2020	Student
BS	Melissa Seib	ME	2019	Applications Engineer, Epicore Biosystems
BS	Matt Beecher	EE	2019	Engineer, Draper
BS	Darija Dilba	BME	2019	Student
BS	Ian Moore	ME	2019	Student
BS	Casey Little	RMS	2019	Teach for America
BS	Isabella Sierra	RMS	2019	Student
BS	Gianna Barnhart	Neuroscience	2018	Student
BS	Caroline Duksta	Neuroscience	2018	Student
BS	Steve Anderau	ME	2018	Research Engineer II, University of Michigan
BS	Chris Petrillo	ME	2018	Knowledge Engineer, Amazon
BS	Ali Gohlke-Schermer	ME	2018	Applications Engineer, Global Foundries
BS	Kaseya Xia	BME	2018	Student
BS	Sarah Hampson	BME	2018	Student
BS	Adam Barson	CS	2018	IBM
BS	Chris Erkson	BME	2017	Student
BS	Danielle Sedler	BME	2017	Student
BS	Javier Buñuel Redrado	EE	2017	UD Mutilvera (Professional Soccer Club)

Student Awards:

Year	**Student**	**Award**
2021	Brett Meyer	Masters Student Award, UVM Department of Electrical and Biomedical Engineering
2020	Reed Gurchiek	IEEE Green Mountain Section Graduate Student of the Year
2020	Reed Gurchiek	Registration Award, American Society of Biomechanics Annual Meeting
2020	Jordyn Scism	BME Graduate Award, UVM Department of Electrical and Biomedical Engineering
2020	Brett Meyer	BME Senior Award, UVM Department of Electrical and Biomedical Engineering
2020	Lara Weed	BME Senior Award, UVM Department of Electrical and Biomedical Engineering
2020	Reed Gurchiek	ME Department Research Award, UVM Department of Mechanical Engineering
2020	Rose Warren	National Science Foundation (NSF) Graduate Research Fellowship
2020	Sam Fox	VTSGC Fellowship, VT Space Grant Consortium / NASA EPSCoR
2019	Reed Gurchiek	McClure Musculoskeletal Research Award, UVM Department of Ortho. and Rehab.
2019	Lindsey Tulipani	Registration Award, 9th International Conference on Gait and Balance in Multiple Sclerosis
2019	Reed Gurchiek	NSF Registration Award, IEEE International Conference on Body Sensor Networks
2019	Reed Gurchiek	Best Student Presentation, IEEE International Conference on Body Sensor Networks
2019	Reed Gurchiek	VTSGC Fellowship, VT Space Grant Consortium / NASA EPSCoR
2019	Blake Hewgill	VTSGC Fellowship, VT Space Grant Consortium / NASA EPSCoR
2019	Lukas Adamowicz	ME Department Research Award, UVM Department of Mechanical Engineering
2019	Lukas Adamowicz	Outstanding MS Thesis Award, UVM Graduate College
2019	Lindsey Tulipani	Educational Travel Grant, Americas Committee for Treatment and Research in MS

TEACHING EXPERIENCE

Formal lecture courses:

Term	Course	#	UG	G	QE[1]	QL[2]	QD[3]
F16	System Dynamics[5]	ME111	32	0	4.72	4.41	4.03
S17	Dynamics[5]	ME012	20	0	4.07	3.60	4.40
S17	Intro. to Biomedical Engineering Design[4]	BME001	30	0	4.26	3.96	3.74
S17	Biomedical Engineering Lab I[4]	BME081	16	0	NA	NA	NA
S17	Wearable Sensors[4]	BME240	20	4	4.57	4.64	4.29

F17	Electrical Engineering Concepts[5]	EE100	31	0	4.44	4.22	4.41
F17	Fall BME Workshop[4]	BME151	20	0	3.83	3.33	2.67
S18	Wearable Sensors	BME240	18	3	4.37	4.32	3.95
F18	Biomedical Signal Processing[4]	BME241	18	8	4.72	4.48	4.32
S19	Digital Biomarkers[4]	BME396	6	6	4.75	4.50	4.25
S20	Wearable Sensors[6]	BME240	11	4	4.86	4.57	4.43
F20	Biomedical Signal Processing[6]	BME241	9	3	4.86	4.57	4.14
S21	BME Design 0[4,6]	BME010	42	0	IP	IP	IP
S21	Spring BME Workshop[5,6]	BME152	38	0	IP	IP	IP
				Average	4.50	4.24	4.06
				CEMS Average	3.97	3.92	3.83

[1] What was the overall effectiveness of the instructor? (5 – very effective)
[2] How much did you learn in this course? (5 – very much)
[3] How academically and intellectually challenging was this course? (5 – very challenging)
[4] New course
[5] First time offering course
[6] Offered during COVID Pandemic
NA: Not Assessed, IP: In Progress
UG: Number of Undergraduate Students, G: Number of Graduate Students

Dr. McGinnis regularly offers independent study and research courses for students each semester. Topics range from development of mobile health apps to applications of signal processing and machine learning in human health.

INDUSTRY EXPERIENCE

Research and Development Consultant — Impellia — June-August 2017
Responsible for the development and validation of computational algorithms which utilize data from an array of wearable sensors to quantify athletic injury risk and inform return to play decisions.

Algorithms Consultant — MC10, Inc. — August-October 2016
Senior Algorithms Engineer — March-August 2016
Algorithms Engineer — November 2014-March 2016
Responsible for leading an interdisciplinary team to develop and validate algorithms that utilize accelerometer, angular rate gyro, and biopotential (ECG, EMG) signals to provide actionable insights for medical applications ranging from rehab from joint replacement surgery to monitoring and treatment of neurological disorders.

Research and Development Consultant — iTrainer Golf Ltd. — July 2012-July 2016
Responsible for the development and validation of computational algorithms which utilize data from an inertial measurement unit to quantify the motion of dynamical systems including gold clubs, bowling balls, and cruise ship terminals.

Research and Development Consultant — Wilson Sporting Goods — July 2015-July 2016
Louisville Slugger — February-December 2012
Responsible for the development and validation of an inertial sensor based baseball and softball bat fitting system.

Research and Development Consultant — Ebonite International — July-October 2012
Responsible for updating existing inertial sensor based bowler analysis tool for use with the latest generation inertial sensors.

HONORS AND AWARDS

IEEE Senior Member — April 2021

National Science Foundation (NSF) CAREER Award — March 2021

IEEE Green Mountain Section Young Engineer of the Year	November 2020
CEMS Outstanding Faculty Advisor Award (University of Vermont)	December 2017
Kroepsch-Maurice Excellence in Teaching Award Nominee (University of Vermont)	May 2017, 2018
Best Paper Award, Biomedical and Biotechnology Engineering, Dynamics and Control in Biomechanical Systems, ASME IMECE 2013 Benchmarking the Accuracy of Inertial Measurement Units for Estimating Joint Reactions	November 2013
Ivor K. McIvor Award (Excellence in research and scholarship in applied mechanics - biomechanics, University of Michigan)	March 2013
National Science Foundation (NSF) Graduate Research Fellow	May 2010-April 2013
Mechanical Engineering Department Graduate Research Fellow (University of Michigan)	Sept. 2009-May 2010
Carl Jr. and Deborah Anderson Mechanical Engineering Prize (Lafayette College)	April 2009