Randolph E. Hutchison

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Citizenship: US

EDUCATION

University: Clemson Univ.–Bioengineering/Engineer. & Sci. Education, Clemson, SC
Dates: June 2008-August 2011
Field of Study: Biomechanics/Engineering & Science Education Research
Degree: Ph.D. Bioengineering, November 2011.
Research Advisor: Lisa Benson, Ph.D.
Research Topic: Assessment of Knowledge Transfer in the Context of Biomechanics

University: Clemson University–Bioengineering, Clemson, SC
Dates: June 2008-March 2011
Field of Study: Biomechanics
Degree: M.S–Bioengineering, March 2011.
Research Advisors: Lisa Benson, Ph.D.
Research Topic: Quantifying Antalgic Knee Function with a Wireless Gait Analysis System Using Inertial Measurement Units

University: Virginia Tech University–Aerospace & Ocean Engineering, Blacksburg, VA
Dates: August 1994-May 1999.
Field of Study: Aerospace Engineering
Degree: B.S.

PROFESSIONAL EXPERIENCE

Associate Professor, Department of Health Sciences, Furman University, Greenville, SC
2017–Present

Assistant Professor, Department of Health Sciences, Furman University, Greenville, SC
2011–2017

Adjunct Professor (Advising), Department of Bioengineering, Clemson University, Greenville, SC, August 2012–present.

Graduate Research Assistant, Department of Bioengineering/Department of Engineering & Science Education Research, Clemson University, June 2008–July 2011.

Physics & Pre-Engineering Teacher, Science Department, Greer High School, Greer, SC, August 2002–May 2008.

Aerospace Engineer, Structural Designer 2nd/3rd Stage Turbine F-35, Pratt & Whitney Aircraft Engines, West Palm Beach, FL/New Haven, CT, August 1999–June 2002.

Honors and Awards

1. Best Presentation, American Control Conference, Philadelphia, PA (2019)
2. Best Graduate Posters (4th & 5th Place), American Control Conference, Boston, MA. (July 2016)
3. Selected as Omicron Delta Kappa Honor Society Mentor, Tripp Hurt, (April 2015)
4. Selected for *NSF South Carolina EPSCoR/IDeA, Science: Becoming the Messenger* workshop, Madren Center, Clemson, SC. (January 2013)
5. Public Service and Agriculture Next Generation Graduate Fellowship (PSA-NGGF), Clemson University, Clemson, SC. $15,000/yr for 3 years. (August 2008-June 2011)
6. National Board Certification in Physics, Greer High School, Greer, SC. (June 2007)
7. Selected to teach International Baccalaureate two-year physics program. Greer High School, Greer, SC. (June 2006)
8. Teacher of the Year, Greer High School, Greer High School, Greer, SC. (June 2005-August 2006)
9. Awarded Program Administrator Project Lead the Way: 4-year Pre-engineering, Greer High School, Greer, SC. (June 2005)
10. Pratt & Whitney Aircraft Engines, "Eagle Award" ($1,000 Cash Award) for Exemplary Performance, West Palm Beach, FL/Hartford, CT. (August 2000)

Presentations

***** indicates Furman Student (27 Total, 4 Current Students)
† indicates author is student under my mentorship

1. †Caudell, CW; †Smith, S; **Hutchison, R**; and Trilk, J (2022) "EFFECTS OF CHEMOTHERAPY REGIMENS ON SKELETAL MUSCLE MITOCHONDRIAL FUNCTION IN BREAST CANCER PATIENTS MEASURED BY NEAR INFRARED SPECTROSCOPY," *International Journal of Exercise Science: Conference Proceedings*: Vol. 16: Iss. 1, Article 295.
   Available at: https://digitalcommons.wku.edu/ijesab/vol16/iss1/295
2. **Hutchison, Randolph E.**; *Biddle, Sara ('22); Hoogkamer, Wouter; †Thomas, Shernice; Arellano, Christopher J.; *Leggat, Caitlyn ('21); *Lalonde, James ('23); *Abrahamson, Georgie('22). Predictability Of Indoor Track And Cross Country Performances Using D' Or Anaerobic Work Capacity: 115. Medicine & Science in Sports & Exercise 54(9S):p 18-19, September 2022. | DOI: 10.1249/01.mss.0000875288.37465.89
3. *Sun, Kaichen ('21); *Jiang, Ya ('20); *Ross, Haley ('22); **Hutchison, Randolph E.** Modeling Muscle Oxygenation Measured From Wireless, Wearable SmO2 Monitor Above Critical Power,

Medicine & Science in Sports & Exercise: August 2021 - Volume 53 - Issue 8S - p 18 doi: 10.1249/01.mss.0000759232.62066.60

4. *Rhoades, Nathaniel (’21); *Wirzba, Luke (’22); *Abrahamson, Georgie (’22); **Hutchison, Randolph E.** Reliability And Validity Of NIRS SmO2 During Fatigue And Recovery Above And Below Critical Power, Medicine & Science in Sports & Exercise: August 2021 - Volume 53 - Issue 8S - p 29 doi: 10.1249/01.mss.0000759388.72378.c1
5. *Coppi, Mason J.(’21); Murr, Scott; Sobolewski, Eric; **Hutchison, Randolph E.**; *Whyte, Alec(’20); *Ogden, Jake T.(’21); *Lara, Frank(’20); *Mandato, Trent(’21) Normalizing Running Power By Muscle CSA Increases Variance Explained Compared To Metabolic Power, Medicine & Science in Sports & Exercise: July 2020 - Volume 52 - Issue 7S - p 723-724 doi: 10.1249/01.mss.0000683048.07407.93
6. **Hutchison, Randolph E.**[1]; *Edwards, Karlee S.[1]('16); *Klapthor, Gibson[1](’15); *Shearer, Lee[1](’19); Mocko, Gregory M.[2]; Vahidi, Ardalan[2] Effects Of w’ Depletion On The Torque Velocity Relationship In Cycling, Medicine & Science in Sports & Exercise: July 2020 - Volume 52 - Issue 7S - p 264 doi: 10.1249/01.mss.0000676420.17268.6d
7. *Bruneau, K., *Shearer, L., *Lee, S., *Knowles, K., †**Hutchison, R.** (2017). Relationship between SMO2 Measured by NIRS and VO2 During Recovery Periods of Running. *Medicine and science in sports and exercise 49(5S)*: 637. Denver, CO. DOI: 10.1249/01.mss.0000518675.37488.70.
8. *Shearer, L., *Bruneau, K., *Lee, S., *Knowles, K., †**Hutchison, R.** (2017). Relationship between SMO2 Measured by NIRS And VO2 During Severe Intensity Intervals of Running. *Medicine and science in sports and exercise 49(5S)*: 636-637. Denver, CO. DOI: 10.1249/01.mss.0000518674.43326.93.
9. **Hutchison, R.,** *Bruneau, K., *Lee, S., *Shearer, L., Caterisano, A. (2017). Comparison of Peak Ground Reaction Forces of Flexible Barbell and Steel Olympic Barbell at Various Lifting Speeds. *Medicine and science in sports and exercise 49(5S)*: 388-389. Denver, CO. DOI: 10.1249/01.mss.0000517943.86734.db.
10. *Lee, S., †**Hutchison, R.,** *Hayden, N., *Alimonti, S., Caterisano, A. (2017). Comparison of the Effect of Flexible Barbell Weight Position on Max Ground Reaction Force. *Medicine and science in sports and exercise 49(5S)*: 389. Denver, CO. DOI: 10.1249/01.mss.0000517944.86734.15.
11. *Klapthor, G., †**Hutchison, R.**, *Edwards, K., *Knowles, K., *Humes, K., Mocko, G., Vahidi, A. (2016). Validity And Reliability Of A Pedal-based Power Meter During Maximal Ergometer Testing. *Medicine and science in sports and exercise 48(5S)*: 107. Boston, MA. DOI: 10.1249/01.mss.0000485325.28607.
12. **Hutchison, R.**, *Klapthor, G., *Knowles, K., *Edwards, K., *Humes, K., Mocko, G., Vahidi, A. (2016). Comparison Of Ventilatory Thresholds Via V-slope Method To Lactate Thresholds With NIRS. *Medicine and science in sports and exercise 48(5S)*: 107. Boston, MA. DOI: 10.1249/01.mss.0000485326.36231.d0
13. *Edwards, K., †**Hutchison, R.**, *Klapthor, G., *Knowles, K., Mocko, G., Vahidi, A., Humes, K., Murr, S. (2016). Comparison of Threshold Determinations between Blood Lactate Samples and Near Infrared Spectroscopy. *Medicine and science in sports and exercise 48(5S)*: 434. Boston, MA. DOI: 10.1249/01.mss.0000486305.19496.f9
14. Caterisano, A., **Hutchison, R.** (2016). A Comparison of Lower Extremity Joint Kinetics Between a Flexible Barbell and a Steel Barbell. *Medicine and science in sports and exercise 48(5S)*: 882. Boston, MA. DOI: 10.1249/01.mss.0000487642.26373.ba

15. *Klabunde, N., *Tant, O., Caterisano, A., †**Hutchison, R.** (2015) Comparison of Core Muscle Activity Between Back Squat and Push Press. *Medicine & Science in Sports & Exercise 47(5S): 348-358*. San Diego, CA. DOI:10.1249/01.mss.0000466055.04700.5b
16. Caterisano, A., **Hutchison, R.**, *Tant, O., *Klabunde, N. (2015). Comparison of Core Muscle Activity between Flexible Barbell and Olympic Barbell during the Squat. *Medicine & Science in Sports & Exercise 47(5S): 348-358*. San Diego, CA. DOI:10.1249/01.mss.0000466055.04700.5b
17. *Tant, O., *Klabunde, N., †**Hutchison, R.**, Caterisano, A. (2015). Muscle Activity of a Standard Olympic Barbell Versus a Flexible Barbell for the Push Press. *Medicine & Science in Sports & Exercise, 47(5S)*: 931. San Diego, CA. DOI:10.1249/01.mss.0000479258.36806.13
18. **Hutchison, R.**, Caterisano, A., *Klabunde, N., *Tant, O. (2015). Comparison of Core Muscle Activity Between the Push Press and Squat Using a Flexible Barbell. *Medicine & Science in Sports & Exercise, 47(5S):* 351-352. San Diego, CA. DOI: 10.1249/01.mss.0000477377.22610.36
19. Lucas, E., O'Donnell, J., Desjardins, J. D., †**Hutchison, R.** (2013). Estimation of Joint Forces and Moments Induced by Knee Fusion for the Purposes of the Design and Optimization of an Arthrodesis Implant. *Conference Paper at 11th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering-2013,* Salt Lake City, Utah. ISBN: 978-1-63439-437-6 https://furman.box.com/s/wbyi0h61x9wmw7s6iayb6ncfhi8dzdl1
20. **Hutchison, R.**, Faber, C. J., Benson, L. C., Kirn, A., Desjardins, J. D. (2013). Assessing student knowledge transfer during group work. *Conference Paper in Proceedings-Frontiers in Education Conference-IEEE.* Oklahoma City, OK. DOI: 10.1109/FIE.2013.6684971 https://furman.box.com/s/pelj5l2e5xinlqoqbat56ywtqwqd3y1k
21. **Hutchison, R.**, Benson, L. C. (2012). Assessing Dynamic Transfer of Biomechanics Knowledge Using the Teaching interview. *Proceedings of BMES Annual Meeting 2012*. Atlanta, GA.
22. **Hutchison, R.,** Desjardins, J., Benson, L. (2011). Use of Situated Cognition and Constructivist Theories to teach Movement Science and Biomechanics. *ASEE Annual Conference Proceedings-2011*. Louisville, KY.
23. Benson, L., Bowman, D., **Hutchison, R.,** Wade, C. (2009). Tutorials And In-Class Activity For Improving Student Performance In A First-Year Engineering Course. *ASEE Annual Conference Proceedings*. Austin, TX.

Published Manuscripts

1. †Sreedhara, V.S.M., Mocko, G.M. & **Hutchison, R.E.** Repeatability and Variability of the 3-Min All-Out Test at the Subject Level. *J. of SCI. IN SPORT AND EXERCISE* **5**, 77–86 (2023). https://doi.org/10.1007/s42978-021-00156-8
2. †F. Ashtiani, V. S. M. Sreedhara, A. Vahidi, **R. Hutchison** and G. Mocko, "Optimal Pacing of a Cyclist in a Time Trial Based on Individualized Models of Fatigue and Recovery," in IEEE Transactions on Control Systems Technology, vol. 31, no. 1, pp. 317-332, Jan. 2023, doi: 10.1109/TCST.2022.3178930.

3. Sobolewski, E.J., Crow (’20), J.M., Murr, S. & **Hutchison, R.E.** (2021). Physiological Performance Characteristics of Male and Female Division I Cross-Country Runners. International Journal of Sport, Exercise & Training Sciences. 7(2). 84-75.
4. †Sreedhara, Vijay Sarthy M.; †Ashtiani, Faraz; Mocko, Gregory M.; Vahidi, Ardalan; **Hutchison, Randolph E.** Response, Medicine & Science in Sports & Exercise: February 2021 - Volume 53 - Issue 2 - p 456 doi: 10.1249/MSS.0000000000002505
5. †SREEDHARA, VIJAY SARTHY M.[1]; †ASHTIANI, FARAZ[1]; MOCKO, GREGORY M.[1]; VAHIDI, ARDALAN[1]; **Hutchison, Randolph E.** Modeling the Recovery of W′ in the Moderate to Heavy Exercise Intensity Domain, Medicine & Science in Sports & Exercise: December 2020 - Volume 52 - Issue 12 - p 2646-2654 doi: 10.1249/MSS.0000000000002425
6. †Sreedhara, V.S.M., Mocko, G.M. & **Hutchison, R.E.** A survey of mathematical models of human performance using power and energy. *Sports Med - Open* 5, 54 (2019). https://doi.org/10.1186/s40798-019-0230-z
7. **Hutchison, R.**, Caterisano, A., (2019). Comparison of Peak Force, Joint Kinetics and Muscle Activity between a Flexible and Steel Barbell during the Back Squat Exercise. *Journal of Human Kinetics*.
8. **Hutchison, R.,** Lucas, E., Gambon, T., Justin Marro, J., *Bruneau, K., DesJardins, J. (2019). The Effects of Simulated Knee Arthrodesis on Gait Kinematics and Kinetics. *Journal of Engineering in Medicine*.
9. Caterisano, A., **Hutchison, R.**, Parker, C., James, S., & Opskar, S. (2018). Improved Functional Power Over a 5-Week Period: Comparison of Combined Weight Training to Flexible Barbell Training. *The Journal of Strength & Conditioning Research*, *32*(8), 2109-2115.
10. **Hutchison, R.** Myers, J., Grove, K., *Bruneau, K., Desjardins J. (2017). Evaluation of Isokinetic Single-Leg Cycling as a Rehabilitation Exercise Following Anterior Cruciate Ligament Reconstruction Surgery. *Journal of Functional Morphology and Kinesiology.*
11. **Hutchison, R.**, Caterisano, A., (2017). Electromyographic and Kinetic Comparison of a Flexible and Steel Barbell. *Journal of Human Sport and Exercise*.
12. **Hutchison, R.**, *Klapthor, G., *Edwards, K., Vahidi, A., Mocko, G. (2016). Validity and Reliability of a Garmin Vector Power Meter Compared with the SRM Power Meter." *Journal of Sports Science*.

Manuscripts in Preparation

1. **Hutchison, R.**, †Shannon Smith, †Chloe Caudell, *Sara Biddle (’22), W. Larry Gluck, Jennifer Trilk. Evaluation of chemotherapy effects on skeletal muscle mitochondrial oxidative capacity using Near-Infrared Spectroscopy (NIRS): Protocol paper for an observational mixed model repeated measures design. *PLOS ONE.*
2. **Hutchison, R.,** *Edwards, K. , *Klapthor, G., *Humes, K., Vahidi, A., Mocko, G. Effect of Anaerobic Work Expenditure above Critical Power on the Torque-Velocity Relationship. *Sport Biomechanics.*

Grants

1. **The Institute for the Advancement of Community Health (IACH) Faculty Fellowships.** “*Effects of Chemotherapy Regimens on Skeletal Muscle Mitochondrial Function in Breast Cancer and Gynecological Cancer Patients Measured by Near Infrared Spectroscopy”*

R.E. Hutchison (Co-Investigators with Gluck, L., Trilk, J, Chosed, R)
$9500
2023-Present **(Funded)**

2. **PRISMA Seed Grant,** "*Uncovering Fatigue Mechanisms With Cancer Treatment: Mitochondrial Capacity And Correlated Molecular Changes In Breast Cancer Patients Undergoing Comparative Chemotherapy Regimens*"
R.E. Hutchison (Co-Investigators with Gluck, L., Trilk, J, Chosed, R)
$20,000
2022-Present **(Funded)**

3. **National Institutes of Health (NIH) - IDeA Networks of Biomedical Research Excellence** "*Uncovering fatigue mechanisms with cancer treatment: mitochondrial capacity and correlated molecular changes in breast cancer patients undergoing comparative chemotherapy regimens*"
R.E. Hutchison (Co-Investigators with Gluck, L., Trilk, J, Chosed, R)
$10,000
2022-Present **(Funded)**

4. **PRISMA Cancer Institute in partnership with USC School of Medicine Greenville Philanthropic grant:** *"A METHOD FOR MEASURING MUSCLE MITOCHONDRIAL OXIDATIVE CAPACITY IN CANCER SURVIVORS USING NEAR INFRARED SPECTROSCOPY"*
R.E. Hutchison (Co-Investigators with Gluck, L., Trilk, J, Chosed, R)
$16,000
2021-Present **(Funded)**

5. **IACH Faculty Fellowship Summer 2020,** "*Modeling and Sensing Human Fatigue and Recovery with Applications in Real-Time Health Monitoring*"
R.E. Hutchison (Principal Investigator)
$9500
2020-2022 **(Funded)**

6. **Furman Research Proposal Grant,** "*Wireless Near Infrared Spectroscopy (NIRS) for Modeling and Sensing Human Fatigue and Recovery with Applications in Real-Time Health Monitoring*," Furman University, Greenville, SC
R.E. Hutchison (Principal Investigator)
$2,000
November 2016-May 2019 **(Funded)**
https://furman.box.com/s/oyeowixox67kcm53qedd85jppzcwexj5

7. **Brooks Institute at Clemson University.** "*Human Energy Expenditure and Recovery Modeling*," Furman University, Greenville, SC
G. Mocko and A. Vahidi (Co-Principal Investigators)
R.E. Hutchison (Co-Investigator)
$15,000

May 2016 – May 2019 **(Submitted August 2016)**
https://furman.box.com/s/bvb6wm5b11y6c09ytpa668vwsra759at

8. **NSF Cyber-Physical Systems 15-541, Proposal ID-1544650,** "*Cyber-Enabled Monitoring of Fatigue Dynamics During Physical Activity with Applications to Fitness and Health*," Furman University, Greenville, SC
   A. Vahidi, G. Mocko, and R.E. Hutchison (Co-Principal Investigators)
   $628,608
   December 2015 - May 2019 **(Not-Funded, requested revise/resubmit)**
   https://furman.box.com/s/0fr6vir8vibacb2vlw2hr920pvsslojj

9. **Furman Research Proposal Grant,** "*Wireless Electromyography (EMG) for Modeling and Sensing Human Fatigue and Recovery with Applications in Real-Time Health Monitoring*," Furman University, Greenville, SC
   R.E. Hutchison (Principal Investigator)
   $2,000
   November 2016-May 2019 **(Funded)**
   https://furman.box.com/s/llar5i0jepnrprnfz5g9okhuvtbzqbna

10. **NIH INBRE Furman Faculty & Student Fellowships, "***Modeling and Sensing Human Fatigue and Recovery with Applications in Real-Time Health Monitoring*," Furman University, Greenville, SC
    R.E. Hutchison (Principal Investigator)
    $17,500
    May 2015 – May 2016 **(Funded)**
    https://furman.box.com/s/sdeueclxl1x8trb88ba53ncfjjqq9eve

11. **NSF/NIH Smart & Connected Health 13-543, Proposal ID-1502207,** "*Modeling and Sensing Human Fatigue and Recovery with Applications in Real-Time Health Monitoring*," Furman University, Greenville, SC
    A. Vahidi, G. Mocko, and R.E. Hutchison (Co-Principal Investigators)
    $500,000
    May 2015 - May 2019 **(Not-Funded, requested revise/resubmit)**
    https://furman.box.com/s/6kvsgvss09g1x1hnffvpb8z5z26gwjre

12. **DARPA Warrior Web, BAA-13-43,** "*SPARC: Soldier Performance Augmented Response Clothing,*" Clemson University, Clemson, SC
    C. Cole (Principal Investigator)
    R.E. Hutchison (Subcontract Principal Investigator)
    $92,744
    April 2014 – September 2014 **(Not Funded)**
    https://furman.box.com/s/vw6lcibuja44osr76gic1r2b9inyp17k

13. **American Colleges of the South (ACS),** "*A Faculty Learning Community on Blended Learning: Developing and Implementing Best Practices at Furman University*," Furman University, Greenville, SC

D. Haney (Principal Investigator)
R.E. Hutchison (Co-Investigator)
$4000
January 2013 – May 2014 **(Funded)**
https://furman.box.com/s/z5j390du66z287o6u6bubg71yn5anbvf

14. **Spencer Dissertation Fellowship for Research Related to Education,** "*Assessment of Knowledge Transfer in the Context of Biomechanics*," Clemson University, Clemson, SC
R.E. Hutchison (Principal Investigator)
$25,000
June 2011-June 2012 **(Not Funded)**

15. **Public Service and Agriculture Next Generation Graduate Fellowship (PSA-NGGF)**, "*PAccMAn: Portable Accelerometer Motion Analysis System*," Clemson University, Clemson, SC.
$15,000/yr for 3 years
August 2008-June 2011 **(Funded)**

16. **NSF- Center for Advanced Engineering Fibers and Films**, "*Engineering Fibers and Films Experience (EFF-X)*," Clemson University, Clemson, SC
$500
June –August 2007 **(Funded)**

17. **Project Lead The Way,** "*Science, Technology, Engineering, & Math (STEM) Education Using Robotics*," Greer High School, Greer, SC
R.E. Hutchison (Principal Investigator)
$25,000
September 2006-June 2008 **(Funded)**

Invited Presentations

1. †Caudell, CW; †Smith, S; **Hutchison, R**; and Trilk *A METHOD FOR MEASURING MUSCLE MITOCHONDRIAL OXIDATIVE CAPACITY IN CANCER SURVIVORS USING NEAR INFRARED SPECTROSCOPY USC School of Medicine Summer Scholars Program*. **(1st Place, Best Presentation)**

2. Ashtiani, F., Vahidi, A., Mocko, G., Sreedhara, V., **Hutchison, R.** (2019). Modeling and Real-Time Estimation of Muscle Fatigue Dynamics During Physical Activity. *Proceedings of American Control Conference.* Philadelphia, PA. **(1st Place, Best Presention)**

3. Ashtiani, F., Vahidi, A., Mocko, G, **Hutchison, R.** (2016). Modeling and Real-Time Estimation of Muscle Fatigue Dynamics During Physical Activity. *Proceedings of American Control Conference.* Boston, MA. **(4th Place, Best Graduate Poster)**
https://furman.box.com/s/1cmwqu47vrotr0myvmralvugmbeh9f1y

4. Bickford, P., Mocko, G, Sarthy, V., Sreedhara, M., **Hutchison, R.** (2016). Using Noninvasive Sensors to Optimize Human Performance. *Proceedings of American Control Conference.* Boston, MA. **(5th Place, Best Graduate Poster)** https://furman.box.com/s/g68cbxcpowmtm6l8rly2msytq4g4k8e8

5. **"**The Professoriate at a Liberal Arts Institution," ESED8880 – *Preparing for the Professoriate*, Clemson University, Clemson, SC, November 4, 2015.

6. **"**The Professoriate at a Liberal Arts Institution," ESED8880 – *Preparing for the Professoriate*, Clemson University, Clemson, SC, October 16, 2014.

7. **"**The Professoriate at a Liberal Arts Institution," *ESED8880 – Preparing for the Professoriate*, Clemson University, Clemson, SC, September 12, 2013.

8. Caterisano T., **Hutchison, R.**, Bouzarth, L. "Tsunami Barbell Collaborative Research Project," *Furman University Faculty Retreat Presentation.* Greenville, SC. August, 16, 2012.

9. **"**Assessment of Knowledge Transfer in the Context of Biomechanics", *ESEC8000 – Seminar in Engineering and Science Education*, Clemson University, Clemson, SC, March 2, 2012.

10. **"**Uniaxial Stress-Strain in Biomaterials," *BIOE320 – Biomechanics*, Clemson University, Clemson, SC, January 14 and 19, 2010.

11. **"**Beam Modeling of Stress-Strain in Biomaterials," *BIOE320 – Biomechanics*, Clemson University, Clemson, SC, January 21 and 26, 2010.

12. **"**Torsional Stress-Strain in Biomaterials," *BIOE320 – Biomechanics*, Clemson University, Clemson, SC, January 28 and February 2, 2010.

13. "The Physics of Cycling," *Greenville Spinners Bicycle Club*. Greenville, SC, October 13, 2009.

14. "Using Physics with Cycling Team Strategy," *Greenville Spinners Bicycle Race Team*. Greenville, SC, September 13, 2009.

Collaborators and Other Affiliations

Recent Collaborators (total 15):
L. Gluck (PRISMA Cancer Institute), J. Trilk (USC School of Medicine Greenville), R. Chosed (USC School of Medicine Greenville), A. Vahidi (Clemson), G. Mocko (Clemson), L. Benson (Clemson), L. Bozarth (Furman), J. Brooks (Clemson), A. Caterisano (Furman), J. Desjardin (Clemson), G. Mocko (Clemson), S. Kautz (MUSC), S. Keiser, MD (Bon Secours St. Francis Health System), R. Moss (Furman)

Graduate Advisors (total 2): Lisa Benson, Ph.D. and John Desjardin, Ph.D.(Clemson)

Student Research Mentoring/Advising

*****indicates Furman Student (27 Total, 4 Current Students)

Thesis/Dissertation Qualifier/Proposal /Defense Committee Member
Past Graduate Students Co-Advised (total 8):
Faraz Ashtiani (Ph.D. 2021) *"Optimal Pacing of cyclists in a Time Trial Based on Experimentally Calibrated Models of Fatigue and Recovery."*

Vijay Sarthy Sreedhara (Ph.D. 2020) *"Modeling energy expenditure and recovery in cycling."*

Phoebe Bickford (M.S. 2016) *"Using Noninvasive Sensors to Optimize Human Performance."*

Eric Lucas (Ph.D. 2014), *"Flexion Enhancing Total Knee Replacement Implant Design Development and Testing."* (May 2010–May 2014)

Jessica Myers (M.S. 14), *"Evaluation of Isokinetic Single-Leg Cycling as a Rehabilitation Exercise Following Anterior Cruciate Ligament Reconstruction Surgery."* (May 2013–August 2015)

Justin Morro (M.S. 13), *"Surface Electromyography Techniques and Use in Simulated Arthrodesis Gait Analysis."* (May 2012–May 2013)

Virginia King (M.S. 13), *"A Review of the ACL Biomechanics, Rehabilitation, and Evaluation of Quadriceps Avoidance During Single-Leg Cycling."* (May 2012–May 2013)

Nicole Durig (M.S. 2013), *"Development of the Clemson University Orthopaedic Implant Retrieval Program."* (August 2011–June 2013)

Post-Doctoral Scholars (total 0):

Professional Activities

Memberships
Member, American College of Sports Medicine – ASCM (2012–present)
Member, American Kinesiology Association – AKA (2011–2017)
Member, National Association for Research in Science Teaching (2012)
Member, Institute of Electrical and Electronics Engineers (IEEE)
Member, Frontiers in Education (FIE)
Member, American Society of Engineering Education – ASEE (2008–2012)
Member, Biomedical Engineering Society – BMES (2008–2012)
Member, Board Member/ Race Team Co-Manager (2007–2009), Greenville Spinners Bicycle Race Team/Club – GSBRT (2005–2012)

Symposia and Conferences
American College of Sports Medicine 2023
Furman Engaged! 2023
American College of Sports Medicine 2022
Furman Engaged! 2022

American College of Sports Medicine 2021
Furman Engaged! 2021
International Engineering of Sport Conference 2020
American College of Sports Medicine 2020
Furman Engaged! 2020
American Control Conference 2019
American College of Sports Medicine 2019
Furman Engaged! 2019
American College of Sports Medicine 2018
Furman Engaged! 2018
American College of Sports Medicine 2017
Furman Engaged! 2017
American College of Sports Medicine 2016
Furman Engaged! 2016
American College of Sports Medicine 2015
Furman Engaged! 2015
American College of Sports Medicine 2014
Furman Engaged! 2014
National Association for Research in Science Teaching 2014
American College of Sports Medicine 2013
Furman Engaged! 2013
Frontiers in Education, Institute of Electrical and Electronics Engineers 2013
Furman Engaged! 2012
Biomedical Engineering Society 2012
American Society of Engineering Education 2011
Furman Engaged! 2011
American Society of Engineering Education 2009

TEACHING EXPERIENCE

Furman University, Greenville, SC

Instructor of Record

HSC323 – Kinesiology (Spring 2012-Present)
FYW1264 – First Year Writing Seminar - "Can Humans Fly?" (Fall 2016-Present)
FYS1214 – First Year Seminar - "Can Humans Fly?" (Fall 2014)
HSC101 – Wellness Concepts (Fall 2011-Present)
HSC201 – Research Methods and Evaluation (2019-Present)
HSC451–Biomechanics (2019-Present)
BIO260 – Introduction to Biomaterials (MayX 2017-Present, *Study Abroad 2022-Present)

Clemson University, Clemson, SC

Instructor of Record

BIOE461 - Movement Science in Biomechanics (Summer 2009, Summer 2010)

Guest Lecturer

ESED8880 – Preparing for the Professoriate (Fall 2013-Fall 2015)
ESEC8000 – Seminar in Engineering and Science Education (March 2012)

BIOE320 – Biomechanics (Fall 2010)

Greer High School, Greer, SC

Teacher

Project Lead the Way – Computer Integrated Manufacturing (2007-2008)
International Baccalaureate Physics (2006-2008)
Project Lead the Way – Principles of Engineering (2006-2008)
Project Lead the Way – Introduction to Engineering Design (2005-2008)
Physical Science (2002-2008)

New/Major Revision Course Development

BIO260 Introduction to Biomaterials- Revision to create Study Abroad to Arthrex Biomedical Device, Naples, FL (2022-2023). Titled "MayX- Exploration and Medical Education in Orthopedic Surgery: Arthrex":
I facilitated coordination with Arthrex, a leader in orthopaedic biomedical devices, to provide tours, lectures, and lab experiences at their headquarters in Naples, FL. They additionally had panel discussions about career opportunities at Arthrex with the President and several vice presidents of the company.

HSC/BIO/PHYS/MTH – Biophysics: Experimental Tools and Techniques, Furman University (Future development): This course would cover both the experimental tools and techniques to detect biological processes as well as the fundamental mathematics and physics underlying the use of these tools. From X-Ray to MRI, physics has provided a basis to further explore what it means to be human and this course will focus on how we can address health issues medically using these techniques and tools.

BIO260 – Introduction to Biomaterials, Furman University (Summer 2016-Summer 2017): Previously created by Victoria Turgeon, PhD and Cassandra Wright, PhD (Post-Doc), I have discussed working with Dr. Turgeon to teach the course with possible revamps from my bioengineering background. Current curriculum includes: An exploration of ideas in cardiovascular, orthopedic, and regenerative medicine and how today's technologies and medical innovations have changed these medicines. Course activities will involve trips to local research and medical facilities & hands-on manipulations of biomaterials and devices.

FYS1214 to FYW1264 Conversion - First Year Writing Seminar, "Can Humans Fly?" Furman University (Summer 2016): FYS1214 was converted to a First Year Writing Seminar (FYW). Significant revisions to course content including direct writing and research instruction. Selected as a FYW Fellows to share content and ideas on the FYW program, including a workshop in July 2016.

HSC251: Movement Analysis of Sports Performance, Furman University (Summer 2014): From research in biomechanics and teaching kinesiology, students expressed interest in further pursuing careers in 3D/2D movement analysis (exercise science/biomechanics, coaching, teaching, motion labs, physical therapy, occupational therapy). From ACSM

conferences, found textbooks and relevant technology and incorporated in this course proposal. Course will focus on the study and analysis of human movement patterns in sport and sport injury. Both qualitative and quantitative methods covered in an applied approach by utilizing 3-D and 2-D motion analysis hardware and software in the human performance laboratory as well as in the field. Focus will be on performance improvement and reducing the risk of injury.

HSC323 – Kinesiology, Furman University (Summer 2013): Course had been primarily biomechanics based and was adjusted with major revisions to the overall focus, syllabus, textbooks, and lab activities. Based on interviews with alumni in the allied health fields of physical Therapy and occupational therapy, as well as orthopaedic medical practice, redesigned course based on clinical case studies moving through each major joint of the body. Added multimedia resources to the online class management system as well as lectures to assist with visualization. To synergize material in the health sciences curriculum, structured course decisions were made in partnership with other courses in the department such as Medical Aspects of Athletic Training, Motor Learning, and Anatomy and Physiology.

Clustering FYS1214: Can Humans Fly? & FYW1234: Birds and Society, Furman University (Summer 2015): Partnered with John Quinn, PhD (ornithologist in biology) to cluster FYS concerning birds in society with FYS1214 concentrations of history, biomechanics and consequences of human flight. Development included regular meetings aligning guest lectures, common readings and assignments such as testing bird wings from the biology department in the custom built wind tunnel from FYS1214. Organization includes common field trip experiences such as bird observations during migration at Caesar's Head state park and a trip to the Smithsonian Natural History Museum and Air and Space Museum in Washington D.C.

BIOE320 – Biomechanics, Clemson University (Fall 2010): Development of teaching modules centered on clinically relevant problem-based learning. Use of teaching interviews and reflective discussion groups to explore knowledge transfer inside and outside of classroom

BIOE461 - Movement Science in Biomechanics, International Study in Bioengineering, Brussels, Belgium, Clemson Thomas Greene Campus (Summer 2009, Summer 2010): Designed a movement analysis course for the mostly sophomore level participants. This course was student centered and active inquiry, based on student experimental design to learn overarching biomechanics concepts.

Project Lead the Way (PLTW) – Greer High School (Summer 2005 - Spring 2008): Initiated and developed a four-year PLTW pre-engineering program from the initial connection with feed-in middle schools to internships with industry partnerships. Attended 3 years of training and developed syllabi, lessons, labs, activities, assessments and overall course structure for 3 of the 4 courses including: Introduction to Engineering Design (IED), Principles of Engineering (POE), and Computer and Integrated Manufacturing (CIM).

International Baccalaureate (IB) Physics – Greer High School (Summer 2006-Spring 2008): Part of the High School IB diploma program inaugurated in 2006. Included preparing students for both the AP and IB Physics exams for college credit. Designed entire course including laboratories, lectures, problem sets, and demonstrations.

UNIVERSITY AND PUBLIC SERVICE

Assistant Lab Director – Molnar Human Performance Laboratory Innovations:

1. Lifting Machine for resistance training evaluation and assessment
2. Upgraded Wireless Electromyography
3. Two metabolic ventilatory systems
4. Upgraded cycling ergometry with torque-velocity capability
5. Wireless/non-invasive Near-Infrared Spectroscopy (NIRS)
6. Implemented real-time 3D motion capture/analysis
7. Created laboratory "WIKI" for improvement of undergraduate student-led research
8. Acquired and implemented technology upgrade of Custom Stroke Rehabilitation "Tilt-Cycle" from MUSC (~$250,000)

Metabolic and Biomechanical Testing

1. Furman Institute of Running and Scientific Training Learning Retreats (May 2023)
2. Furman Institute of Running and Scientific Training Learning Retreats (May 2019)
3. Furman Institute of Running and Scientific Training Learning Retreats (May 2018)
4. Furman Institute of Running and Scientific Training Learning Retreats (May 2017)
5. Furman Cross Country Men's and Women's team (August 2016)
6. Furman Institute of Running and Scientific Training Learning Retreats (May 2016)
7. Furman Institute of Running and Scientific Training Learning Retreats (March 2016)
8. Furman Cycling Team (November–December 2015)
9. Furman Elite Track team (August 2015)
10. Furman Institute of Running and Scientific Training Learning Retreats (June 2015)
11. Furman Institute of Running and Scientific Training Learning Retreats (May 2014)
12. Furman Institute of Running and Scientific Training Learning Retreats (May 2013)
13. Furman Institute of Running and Scientific Training Learning Retreats (May 2012)
14. Furman Institute of Running and Scientific Training Learning Retreats (March 2012)
15. Furman Institute of Running and Scientific Training Learning Retreats (May 2011)
16. Furman Institute of Running and Scientific Training Learning Retreats (March 2011)

Continuing Education

1. Solicited Academic and Writing Coach for disseminating professional activity to multiple, diverse audiences. Caroline Eisner Ph.D. (2016 – 2017)
2. Selected for *NSF South Carolina EPSCoR/IDeA, Science: Becoming the Messenger* workshop, Madren Center, Clemson, SC (January 16–17, 2013)
3. Lilly (Cothran) Center for Vocational Reflection, Faculty Seminar, "The Vocations of the Professoriate: Are We Called to Engage the Public?" Furman University, Greenville, SC (April 2013–June 14)

4. "Citadel Principled Leadership Symposium," Faculty Chaperone, Student Representatives: *Anna Bower, *AJ Calhoun, *Keda Dubard, The Citadel, Charleston, SC (March 15–16, 2012)

Committees

1. Curriculum Committee (2023-2026)
2. HSC Promotion Committee (2022)
3. Library Promotion Committee (2021)
4. Chair-newly integrated Library and Information Technology Committee-LIT (merged ACC with Library and Information Technology committee) (2020-2021)
5. Chair-Academic Computing Committee (ACC) (2019-2020)
6. WPER (Writing Program External Review) Committee (2019)
7. New Hire Committee (Led establishment HSC New Hire voting procedures) (Chris Hopkins) (2019-2020)
8. Academic Program Effectiveness Committee (APEC) (2018-2019)
9. Public Health Advisory Committee (2016-Present)
10. Academic Computing Committee (2013-2017)
11. eWeb Implementation Review Committee
12. Blended Learning Grant: Faculty Learning Community

Community Service

1. Metabolic/Biomechanical Testing of Community Members, Clubs and Groups (August 2011–present)
2. Chair of Kallah Retreat Committee, Beth Israel Synagogue, Wellness Activities Director (June 2016–March 2017)
3. "Biology and Culture of Substance Abuse," Faculty Sponsor for PHOKUS, Cultural Life Program, Furman University, Greenville, SC (November 19, 2015)
4. "Have it All with Adderall?" Faculty Sponsor for PHOKUS, Cultural Life Program, Furman University, Greenville, SC (October 29, 2015)
5. "Have it All with Adderall?" Faculty Sponsor for PHOKUS, Cultural Life Program, Furman University, Greenville, SC (March 2, 2015)
6. "According to Josh," Faculty Sponsor for PHOKUS, Cultural Life Program, Furman University, Greenville, SC (January 28, 2015)
7. "Have it All with Adderall?" Faculty Sponsor for PHOKUS, Cultural Life Program, Furman University, Greenville, SC (November 19, 2014)
8. "TedX: Stories," Faculty Sponsor/Advisor for Furman Creative Collaborative, Cultural Life Program, Furman University, Greenville, SC (March 15, 2014)
9. "The Experience & Science of Addiction," Faculty Sponsor for PHOKUS, Cultural Life Program, Furman University, Greenville, SC (November 14, 2012)
10. "Furman Creative Collaborative (FCC): On Cities," Faculty Sponsor/Advisor for Furman Creative Collaborative, Cultural Life Program, Furman University, Greenville, SC (October 22, 2012)
11. Board of Greenville Spinners Bicycle Club, (January 2007–January 2009)
12. Team Captain, Greenville Spinners Bicycle Racing Team (January 2007–January 2009)