William James Richardson, Ph.D.

Dean's Assistant Professor | Department of Bioengineering
Faculty Member | Biomedical Data Science and Informatics Program
Co-Director of Multi-Scale Modeling Core | SC TRIMH Center
Clemson University
301 Rhodes Engineering Research Center, Clemson, SC 29634

wricha4@clemson.edu
864-656-6576
https://cecas.clemson.edu/sysmechbio/

RESEARCH INTERESTS

Personalized medicine
Cardiac matrix remodeling
Cellular mechanotransduction

TEACHING INTERESTS

Computational systems biology
Biomedical data science
Biomechanics & mechanobiology

POSITIONS

Assistant Professor | Clemson University 2016 - present
Department of Bioengineering
Biomedical Data Science-Informatics Program
Co-Director of Multi-Scale Modeling Core, SC TRIMH Center (NIH COBRE P20)

Postdoctoral Research Fellow | University of Virginia 2012 - 2015
Cardiac Biomechanics Group, Dr. Jeff Holmes, & Cardiac Systems Biology Lab, Dr. Jeff Saucerman
Robert M. Berne Cardiovascular Research Center
Department of Biomedical Engineering

Graduate Research Assistant | Texas A&M University 2007 - 2012
Vascular & Lymphatic Mechanics Lab, Dr. Jimmy Moore
Department of Biomedical Engineering

Consultant & Contractor Activity
Boston Scientific Corp. (2008); TissueGen, Inc. (2007)

EDUCATION

Postdoctoral Training, Biomedical Engineering | University of Virginia 2012 - 2015
Mentors: Jeff Holmes, M.D., Ph.D., & Jeff Saucerman, Ph.D.

Ph.D., Biomedical Engineering | Texas A&M University 2007 - 2012
Mentor: Jimmy Moore., Ph.D.
Thesis: *Vascular Smooth Muscle Precursor Cell Behavior in Non-uniform Stretch Environments*

B.S., Biological Engineering | University of Arkansas 2003 - 2007
Minor in Mathematics
Semester Abroad at University of Newcastle, NSW Australia

HONORS

Dean's Professorship, Clemson University College of Engineering, Computing & Applied Sciences 2019 - 2021
American Heart Association Scientist Development Grant Award 2017
Early Career Alumni Award, University of Arkansas College of Engineering 2015
American Heart Association Postdoctoral Fellowship 2014 - 2015
NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship 2014
Richard Skalak Best Paper Award, ASME *Journal of Biomechanical Engineering* 2012
Magna Cum Laude, University of Arkansas 2007
Tau Beta Pi Honors Engineering Society Inductee 2006

TRAINEES

Current

Research Scientist

Patilee Tate, Ph.D. (2019 - present)

Ph.D. Students

Anamul Haque (2020 - present)
Sam Coeyman (2018 - present)
Jonathan Heywood (2018 - present)
Brendyn Miller (2018 - present)
Kelsey Watts (2017 - present)
Michael (Jake) Potter (2017 - present)
Amirreza Yeganegi (2016 - present)

Undergraduate Students

Collin Vogel (2021 - present), Caroline Peak (2020 - present), Ashley Ip (2021 - present), Donald Hartsfield (2020 - present), Ryan Hernandez-Cancela (2020 - present), Alina Kazmi (2020 - present)

Graduate Student Committees

Lydia Petersen (2020 - present), Reese Parr (2020 - present), Joe Hess (2020 - present), Paritra Mandal (2019 - present), Rithwik Jallepalli (2019 - present), Simar Singh (2019 - present), Reece Fratus (2019 - present), Zhao Zhang (2019 - present), Davis Ferriell (2019 - present), Adam Baker (2018 - present), Ziyang Zhang (2017 - present)

Former

Ph.D. Students (1 total)

Jesse Rogers (2016 - 2021)
"Systems Modeling to Predict Mechano-Chemo Interactions in Cardiac Fibrosis"

M.S. Students (2 total)

Michael Ward (2018 - 2020)
"Diagnosis of Myocardial Hypertrophic Disease States through Machine Learning and Mechanistic Modeling"
Jess Batista (2017 - 2018)
"Computational Modeling of a Pulmonary Fibroblast Signaling Network"

Post-bac Researchers (2 total)

Nathan Biyani (2019),
"Machine Learning Algorithm Predicts Patient-Specific Response to Cardiac Resynchronization Therapy"
Karla Robles (2018 - 2019)
"Agent-Based Modeling of Constrained Multicellular Patterns"

Undergraduate Students (17 total)

Margo Courtney (2020 - 2021), Kerri Wong (2019 - 2021), Scott Northup (2019 - 2020), Stephen Frost (2019 - 2020), Helena Guo (2018 - 2019), Jenni Forkin (2018 - 2019), Lydia Peplinski (2019), Michael Malloy (2019), Kyle Cannon (2017 - 2019), Alex Mora Pagán (2018), Bailey Pritchard (2017 - 2018), Zoey Morton (2017 - 2018), Kaleigh Neely (2017 - 2018), David Evans (2017 - 2018), Tiffany Yu (2016 - 2017), Aniqa Chowdhury (2016), Daniel LaShoto (2016)

Graduate Student Committees (16 total)

Meredith Owen (2017 - 2021), Tyler Gibson (2021), Nathan Carrington (2016 - 2020), Cody Dunton (2016 - 2020), Benafsh Husain (2019 - 2020), Olivia Newkirk (2019), Michael Maggio (2019), Tiffany Yu (2017 - 2019), Aseem Pradhan (2017 - 2019), Justin Bacaoat (2017 - 2018), John Scaringi (2017 - 2018), Suzanne Bradley (2017 - 2018), Jared Tallo (2017 - 2018), Brittney Cotton (2017 - 2018), Tyler Harvey (2016 - 2018), Jennifer Anderson (2016)

TEACHING

Clemson University

Introduction to Biomechanics (BIOE 3200)	Spring 2019 - present
Computational Modeling in Bioengineering (BIOE 4350/6350)	Spring 2018 - present
Micro-Heart Pumps & Pipes (BIOE 4510)	Fall 2019 - present
Applied Bioengineering Design (BIOE4030)	Fall 2017
Bioengineering Design Theory (BIOE4010)	Spring 2017
Medical Technology for the Developing World (BIOE4510, Co-instructor)	Spring & Fall 2016 - present
Cardiovascular Eng. & Pathology (BIOE4230/6230, Guest-lecturer)	Spring 2016 - 2018

University of Virginia

Cardiovascular Research Career Development Seminar (BIMS8064, Organizer)	Spring 2014 - 2015

Texas A&M University

Orthopedic Biomechanics (BMEN689, Co-instructor)	Spring 2012

TECH TRANSFER & COMMERCIALIZATION

National Institutes of Health Concept to Clinic: Commercializing Innovation (C3i)

Program participant (competitive selection) 2021

Invention Disclosures & Patents

3) **WJ Richardson**, A Haque, D Stubbs.
"Machine Learning Algorithm to Guide Cardiac Resynchronization Therapy Personalization."
Provisional US Patent Application No. 63/240,146 (2021).

2) **WJ Richardson**, S Coeyman, J Heywood.
"Hydraulic-Based Myocardial Tissue In Vitro Screening Platform."
Provisional US Patent Application No. 63/236,936 (2021).

1) **WJ Richardson**, S Coeyman, J Heywood.
"Magnet-Based Myocardial Tissue In Vitro Screening Platform."
Provisional US Patent Application No. 63/236,936 (2021.

PUBLICATIONS

Pubmed Bibliography: *https://www.ncbi.nlm.nih.gov/myncbi/1z9C8j6cf0rkN/bibliography/public/*

Google Scholar Profile: *https://scholar.google.com/citations?user=ROlHQKkAAAAJ&hl=en*

*Richardson lab member

25) JD Rogers*, BA Aguado, KM Watts, KS Anseth, **WJ Richardson**.
"Network Modeling Predicts Personalized Drug Responses in Myofibroblasts Cultured with Patient Sera."
bioRxiv 2021.09.04.458984 (2021), in revision at *Proceedings of the National Academy of Sciences*.

24) M Ward*, CF Baicu, AD Bradshaw, FG Spinale, MR Zile, **WJ Richardson**.
"Ensemble Machine Learning Model Identifies HFpEF Patients from Matrix-Related Plasma Biomarkers."
In revision at *American Journal of Physiology - Heart & Circulatory Physiology*.

23) CJ Kostelnik, J Hohn, CE Escota-Diaz, JB Kooistra, MM Stern, DE Swinton, **WJ Richardson**, W Carver, JF Eberth.
"Small-Diameter Artery Decellularization: Effects of Anionic Detergent Concentration and Treatment Duration on Porcine Internal Thoracic Arteries."
In revision at *Journal of Biomedical Materials Research: Part B - Applied Biomaterials*

22) JD Rogers*, **WJ Richardson**.
"Fibroblast Signaling Network Model Predicts Mechano-Adaptive Infarct Targets."
bioRxiv 2020.08.13.250001 (2020), in revision at *eLife*.

21) C Gensemer, R Moore, D Fulmer, J Morningstar, KM Watts*, T Beck, C Wang, K Moore, L Guo, F Sieg, Y Nagata, P Bertrand, RA Spampinato, J Glover, **WJ Richardson**, RA Levine, MA Borger, RA Norris.
"Mitral Valve Prolapse Induces Regionalized Myocardial Fibrosis."
Accepted at *Journal of the American Heart Association*.

20) MJ Potter*, **WJ Richardson**.
"Fabrication and Characterization Methods for Investigating Cell-Matrix Interactions in Environments Possessing Spatial Orientation Heterogeneity."
bioRxiv 2021.05.26.445622 (2021), accepted at *Acta Biomaterialia*.

19) KM Watts*, **WJ Richardson**.
"Effects of Sex and 17β-estradiol on Cardiac Fibroblast Morphology and Signaling Activities In Vitro."
Cells 10(10), 2564 (2021).

18) **WJ Richardson**, JD Rogers*, F Spinale.
"Does the Heart Want What It Wants? A case for self-adapting, mechano-sensitive therapies after infarction."
Frontiers in Cardiovascular Medicine 8: 705100. (2021).

17) J Montgomery, **WJ Richardson**, JM Rhett, F Bustos, K Degen, GS Ghatnekar, CL Grek, S Marsh, LJ Jourdan, JW Holmes, RG Gourdie.
"The Connexin 43 Carboxyl Terminal Mimetic Peptide αCT1 Prompts Differentiation of a Collagen Scar Matrix Resembling Unwounded Skin."
FASEB Journal 35: e21762 (2021).

16) JD Rogers*, JW Holmes, JJ Saucerman, **WJ Richardson**.
"Mechano-Chemo Signaling Interactions Modulate Matrix Production by Cardiac Fibroblasts."
Matrix Biology Plus 10:100055 (2021).

15) AC Daulagala, J Yost, A Yeganegi*, **WJ Richardson**, MJ Yost, A Kourtidis.
"A Simple Method to Test Mechanical Strain on Epithelial Cell Monolayers, In-Vitro, using a 3D-Printed Stretcher."
Methods in Molecular Biology - Permeability Barrier, 2367 Springer (2020).

14) MA McCullough, N Msafiri, **WJ Richardson**, M Harman, JD DesJardins, D Dean.
"Development of a Global Design Education Experience in Bioengineering through International Partnerships."
Journal of Biomechanical Engineering 141(12), 124503.1-8 (2019).

13) CE Korenczuk, VH Barocas, **WJ Richardson**.
"Effects of Collagen Heterogeneity on Myocardial Infarct Mechanics in a Multiscale Fiber Network Model."
Journal of Biomechanical Engineering 141(9), 091015.1-9 (2019).
- invited paper for Y.C. Fung tribute issue

12) **WJ Richardson,** B Kegerreis, S Thomopoulos, JW Holmes.
"Potential Strain-Dependent Mechanisms Defining Matrix Alignment in Healing Tendons."
Biomechanics and Modeling in Mechanobiology 17(6), 1569-1580 (2018).

11) JD Rogers*, A Yeganegi*, **WJ Richardson**.
"Mechano-Regulation of Fibrillar Collagen Turnover by Fibroblasts."
Mechanobiology Handbook, 2nd Edition. CRC Press, Ed. J Nagatomi and E Ebong (2018).

10) **WJ Richardson**, JW Holmes.
"Emergence of Collagen Orientation Heterogeneity in Healing Infarcts and an Agent-Based Model."
Biophysical Journal 110(10), 2266-2277 (2016).

9) AC Ziegler, **WJ Richardson**, JW Holmes, JJ Saucerman.
"A Computational Model of Cardiac Fibroblast Signaling Predicts Context-Dependent Drivers of Myofibroblast Differentiation."
Journal of Molecular and Cellular Cardiology 94, 72-81 (2016).

8) SA Clarke, **WJ Richardson**, JW Holmes.
"Modifying the Mechanics of Healing Infarcts: Is Better the Enemy of Good?"
Journal of Molecular and Cellular Cardiology 93, 115-124 (2016).
- invited review

7) AC Ziegler, **WJ Richardson**, JW Holmes, JJ Saucerman.
"Computational Modeling of Cardiac Fibroblasts and Fibrosis."
Journal of Molecular and Cellular Cardiology 93, 73-83 (2016).
- invited review

6) **WJ Richardson**, JW Holmes.
"Why is Infarct Expansion Such an Elusive Therapeutic Target?"
Journal of Cardiovascular Translational Research 8(7), 421-430 (2015).

5) **WJ Richardson**, SA Clarke, TA Quinn, JW Holmes.
"Physiological Implications of Myocardial Scar Structure."
Comprehensive Physiology 5(4), 1877-1909 (2015).
- invited review

4) S Jamalian, CD Bertram, **WJ Richardson**, JE Moore Jr.
"Parameter Sensitivity Analysis of a Lumped-parameter Model of a Chain of Lymphangions in Series."
American Journal of Physiology - Heart & Circulatory Physiology 305(12), H1709-H1717 (2013).

3) **WJ Richardson**, DD van der Voort, JE Moore Jr.
"Differential Orientation of 10T1/2 Mesenchymal Cells on Non-uniform Stretch Environments."
Molecular & Cellular Biomechanics 10(3), 245-265 (2013).

2) **WJ Richardson**, E Wilson, JE Moore Jr.
"Altered Phenotypic Gene Expression of 10T1/2 Mesenchymal Cells in Non-uniformly Stretched PEGDA Hydrogels."
American Journal of Physiology - Cell Physiology 305(1), C100-10 (2013).

1) **WJ Richardson**, R Metz, M Moreno, E Wilson, JE Moore Jr.
"A Device to Study the Effects of Stretch Gradients on Cell Behavior."
Journal of Biomechanical Engineering 133(10), 101008.1-9 (2011).
- **Richard Skalak Best Paper Award,** selected as #1 paper in *JBME* in 2011

CONFERENCE ABSTRACTS

*Richardson lab member

44) J Heywood*, **WJ Richardson**.
"In Vitro 3D Wound Platform to Characterize Myocardial Infarct Healing."
Biomedical Engineering Society Annual Meeting, Orlando, FL (October 2021).

43) KM Watts*, **WJ Richardson**.
"Systems Biology Education Modules to Promote Computational Thinking in High School Students."
American Society for Engineering Education Annual Meeting, Long Beach, CA (July 2021).

42) KM Watts*, **WJ Richardson**.
"Systems Biology Education Modules: Using Biological Phenomena to Teach Computational Modeling to High School Students."
Biomedical Engineering Society Annual Meeting, San Diego, CA (October 2020).

41) JD Rogers*, **WJ Richardson**.
"Fibroblast Mechanotransduction Model Identifies Mechano-Adaptive Drug Targets for Post-Infarct Therapy."
Summer Biomechanics, Bioengineering, and Biotransport Conference, Vail, CO (June 2020).

40) MJ Potter*, **WJ Richardson**.
"Fabricating Heterogeneous Collagen Gels for In Vitro Studies of Cell-Matrix Interactions."
Summer Biomechanics, Bioengineering, and Biotransport Conference, Vail, CO (June 2020).

39) A Yeganegi*, **WJ Richardson**.
"Effect of Mechanical Strain on Collagen Degradation Depends on Protease Type."
Summer Biomechanics, Bioengineering, and Biotransport Conference, Vail, CO (June 2020).

38) KM Watts*, **WJ Richardson**.
"Cyclic Immunofluorescence to Identify Mechanotransduction Pathway Interactions in Cardiac Fibroblasts."

Cell and Molecular Bioengineering Annual Meeting, Rio Grande, PR (January 2020).

37) L Peplinski*, JD Rogers*, J Morris, **WJ Richardson**.
"Substrate Stiffness Alters Trypanosoma Brucei Adhesion."
Annual Biomedical Research Conference for Minority Students, Anaheim, CA (November 2019).

36) D Nigoa, S Mandilwar, A Nukovic, S Tan, MA McCullough, **WJ Richardson**, JD DesJardins, D Dean.
"Save Your Breath! A Low-Cost Oxygen Sensor for Oxygen Concentrators."
Biomedical Engineering Society Annual Meeting, Atlanta, GA (October 2019).

35) J Hohn, C Fix, CJ Kostelnik, MM Stern, DE Swinton, **WJ Richardson**, JF Eberth, W Carver.
"Porcine Internal Thoracic Artery Decellularization: Effects of Chemical and Physical Parameters."
National EPSCoR Conference, Columbia, SC (October 2019).

34) K Yoshida, A Estrada, JW Holmes, **WJ Richardson**.
"Selective Stiffening of a Myocardial Infarct Improves Predicted Systolic Function Without Impairing Filling."
Summer Biomechanics, Bioengineering, and Biotransport Conference, Seven Springs, PA (June 2019).

33) CE Korenczuk, **WJ Richardson**, VH Barocas.
"The Effect of Collagen Heterogeneity on Rat Myocardial Infarct Mechanics in a Multiscale Fiber Network Model."
Summer Biomechanics, Bioengineering, and Biotransport Conference, Seven Springs, PA (June 2019).

32) JD Rogers*, JW Holmes, JJ Saucerman, **WJ Richardson**.
"Mechano-Chemo Signaling Interactions Modulate Matrix Production by Cardiac Fibroblasts."
American Society for Matrix Biology Fibroblast Workshop, Charlottesville, VA (June 2019).

31) JD Rogers*, **WJ Richardson**.
"Effect of Biochemical and Mechanical Stimuli on the Fibrotic Behavior of Cardiac Fibroblasts."
Biomaterials Day, Clemson, SC (November 2018).

30) B Banaszak, M Cattell, J Hadley, R Moen, Z Hargett, M McCullough, **WJ Richardson**, JD DesJardins, D Dean.
"Low Cost Neonatal Infant Insulating and Monitoring System for Remote Rural Areas."
Biomedical Engineering Society Annual Meeting, Atlanta, GA (October 2018).

29) D Nigoa, S Mandilwar, R Fenner, MA McCullough, JD DesJardins, **WJ Richardson**, D Dean.
"Demonstrating the Viability of Using Zinc-Air Batteries in Oxygen Sensors for Low-Resource Settings."
Biomedical Engineering Society Annual Meeting, Atlanta, GA (October 2018).

28) J Boulos, E Gaston, M Grahne, H Nguyen, MA McCullough, **WJ Richardson**, JD DesJardins, D Dean.
"Development of Mobility Device for the Visually Impaired in Developing Countries."
Biomedical Engineering Society Annual Meeting, Atlanta, GA (October 2018).

27) M Elpers, A Harrison, M Downing, OT Mefford, MA McCullough, JD DesJardins, **WJ Richardson**, D Dean.
"Kifua Pampu: A Robust Breast-Pump for the Prevention of Mother to Child Transmission of HIV."
Biomedical Engineering Society Annual Meeting, Atlanta, GA (October 2018).

26) **WJ Richardson**, H Tam, H Cash, MK Owen, JC Kohn, BT Przestrzelski, BW Booth, MA McCullough, KG Mkongwa, U Melkior, NMJ Mbwambo, JD DesJardins, D Dean.
"International Academic Partnership for Diverse Bioengineering Design Education."
World Congress of Biomechanics, Dublin, Ireland (July 2018).

25) A Yeganegi*, **WJ Richardson**.
"A Matrix-Protease Network Model for Computational Predictions of Matrix Turnover."
National IDeA Symposium of Biomedical Research Excellence (NISBRE), Bethesda, MD (June 2018).

24) JF Eberth, **WJ Richardson**, MM Stern, DJ Swinton, W Carver.
"Data-driven optimization of bioengineered vascular scaffolds for small-diameter blood vessel replacement."
South Carolina EPSCoR/IDeA Annual Conference, Columbia, SC (April 2018).

23) JD Rogers*, AC Zeigler, JJ Saucerman, JW Holmes, **WJ Richardson**.
"Fibroblast Systems Mechanobiology Model Predicts Mechano-Adaptive Infarct Therapies."
Cell and Molecular Bioengineering Annual Meeting, Key Largo, FL (January 2018).

22) B Cotton, A Tarasidis, S Stafford, X Lu, T Sanders, **WJ Richardson**, M Harman.

"Characterizing the Effects of Tension on Connective Tissue Formation Surrounding Polymeric Hernia Mesh: A Multi-Scale Approach."
Biomaterials Day, Nashville, TN (August 2017).

21) M Stanford, X Lu, B Cotton, W Cobb, A Carbonell, B Heniford, V Augenstein, **WJ Richardson**, J Mercuri, M Harman.
"Influence of Mesh Mechanics on In Vivo Mesh Performance: a Multi-scale Approach."
Greenville Health System Research Symposium, Greenville, SC (March 2017).

20) A Zeigler, **WJ Richardson**, JW Holmes, JJ Saucerman.
"Using a Computational Model of Cardiac Fibroblast Signaling to Predict Drugs Against Pathologic Remodeling."
ASMB Biennial Meeting, St. Petersburg, FL (November 2016).

19) B Kegerreis, JW Holmes, **WJ Richardson**.
"Modeling the Effect of Strain-induced Collagen Damage on Tendon Scar Structure."
BMES Annual Meeting, Tampa, FL (October 2015).

18) **WJ Richardson**, S Thomopoulos, JW Holmes.
"Strain-dependent Degradation as a Mechanism for the Paradoxical Effects of Mechanical Loading on Collagen Fiber Alignment in Healing Tendon."
Summer Biomechanics, Bioengineering, and Biotransport Conference, Snowbird, UT (June 2015).

17) V Lanka, JW Holmes, **WJ Richardson**.
"A Computational Model of Collagen Fibrillogenesis."
Biomedical Engineering Society Annual Meeting, San Antonio, TX (October 2014).

16) W Pilcher, JW Holmes, **WJ Richardson**.
"Modeling Temporal Dynamics of Infarct Collagen Turnover."
Biomedical Engineering Society Annual Meeting, San Antonio, TX (October 2014).

15) A Zeigler, **WJ Richardson,** JW Holmes, JJ Saucerman.
"A Logic-Based Model of Cardiac Fibroblast Signaling Predicts Switch-Like Behavior."
Biomedical Engineering Society Annual Meeting, San Antonio, TX (October 2014).

14) **WJ Richardson,** AD Rouillard, JW Holmes.
"Heterogeneity of Infarct Collagen Orientation Emerges In Silico Based on Long-range Cell Interaction."
Biomedical Engineering Society Annual Meeting, San Antonio, TX (October 2014).

13) **WJ Richardson,** JW Holmes.
"Do Infarcts Really Expand or Compact? Implications for Design of Novel Therapies."
World Congress of Biomechanics, Boston, MA (July 2014).

12) **WJ Richardson,** JW Holmes.
"Do Infarcts Really Expand or Compact? Relationship between Changing Material Properties and Apparent Infarct Remodeling."
ASME Summer Bioengineering Conference, Sunriver, OR (June 2013).

11) S Jamalian, JE Moore Jr., CD Bertram, **WJ Richardson**.
"Mathematical Modeling of Lymphatic Vessels Using Lumped Parameter Approach."
Biomedical Engineering Society Annual Meeting, Atlanta, GA (October 2012).

10) **WJ Richardson**, DD van der Voort, JE Moore Jr.
"A Device to Subject Cells to Longitudinal Stretch Gradients on a Tube *In Vitro*."
ASME Summer Bioengineering Conference, Fajardo, Puerto Rico (June 2012).

9) S Jamalian, JE Moore Jr., CD Bertram, **WJ Richardson**.
"Parameter Sensitivity Analysis of a Lumped-parameter Model of Lymphangions in Series."
ASME Summer Bioengineering Conference, Fajardo, Puerto Rico (June 2012).

8) JE Weimer, JE Moore Jr., CD Bertram, **WJ Richardson**, BA Placette.
"Development of a Computational Model of Lymphangions in Series - A Parameter Sensitivity Analysis."
ASME Summer Bioengineering Conference, Farmington, PA (June 2011).

7) **WJ Richardson,** JE Moore Jr.
"Smooth Muscle Cell Orientation on Non-uniform Stretch Environments."

ASME Summer Bioengineering Conference, Farmington, PA (June 2011).

6) **WJ Richardson**, R Metz, E Wilson, JE Moore Jr.
"Smooth Muscle Cell Behavior in Non-uniform Stretch Environments."
Biomedical Engineering Society Annual Meeting, Austin, TX (October 2010).

5) E Rahbar, B Placette, **WJ Richardson**, JE Moore Jr.
"Modeling Lymphatic Contractility."

ASME Summer Bioengineering Conference, Naples, FL (June 2010).

4) M Kavdia, **WJ Richardson.**
"A Computational Model of Biochemical Interaction of NO and Reactive Oxygen Species in the Microcirculation."
Proceedings of 8th World Congress for Microcirculation, Bologna, Italy (August 2007).

3) N Lakshmanan, **WJ Richardson**, M Kavdia.
"Leukocyte adhesion and migration in a blood vessel- Effect on nitric oxide and ROS levels."
Experimental Biology (FASEB), Washington, DC (May 2007).

2) N Bhise, R Carlisle, SE Huber, **WJ Richardson**.
"Design to Add Body-Powered Functionality to the International Red Cross Above-Elbow Prosthesis."
Rehabilitation Engineering & Assistive Technology Society of North America National Conference, Phoenix, AZ (June 2007)**.**

1) M Kavdia, MD Chávez, SS Potdar, **WJ Richardson**.
"*In silico* and *in vitro* models of NO, ROS and RNS biotransport: towards understanding of endothelial cell dysfunction."
Arkansas Biosciences Institute (ABI) Research Symposium, Little Rock, AR (October 2006).

FUNDING

Cumulative total funds (direct + indirect) with WJ Richardson as Principal Investigator: $2,277,276
Cumulative direct funds to WJ Richardson's lab group as PI or Co-I: $2,186,059

Current

AHA Predoctoral Fellowship 8/2021 - 7/2022
Title: "Network Regulation of Sex-Specific Mechanotransduction in Cardiac Fibroblasts"
Role: Sponsor (PI: Kelsey Watts, Richardson Lab PhD Student, Clemson University)
Total Award Funds: $31,520 Direct Funds to WJR group: $31,520

South Carolina EPSCoR Grant for Exploratory Academic Research 4/2021 - 9/2022
Title: "Predicting Fibroblast Metabolic Interactions with Mechanically Dynamic Biomaterials"
Role: PI
Total Award Funds: $60,000 Direct Funds to WJR group: $30,000

NIH (NHLBI) R01 HL144927 1/2019 - 12/2023
Title: "Systems Mechanobiology Modeling for Patient-Specific Cardiac Fibrosis Predictions"
Role: PI
Total Award Funds: $1,846,994 Direct Funds to WJR group: $941,502

NIH (NIGMS) COBRE P20 GM121342 8/2018 - 7/2023
Center Title: "South Carolina COBRE for Translational Research Improving Musculoskeletal Health"
Project Title: "Predicting Collagen Turnover for Tendon Repair across Diverse Loading Environments"
Roles: Co-Director of Multi-Scale Modeling Core
& Target Project PI (Center PI: Hai Yao, Clemson University)
Total Award Funds: $11,088,275 Direct Funds to WJR group: $333,755

NSF REU Program 1/2019 - 12/2021
Title: "Nature's Machinery through the Prism of Physics, Biology, Chemistry and Engineering"
Role: Co-I (PI: Josh Alper, Clemson University)
Total Award Funds: $419,295 Direct Funds to WJR group: $0

Completed

NIH (NIGMS) INBRE-COBRE Supplement P20 GM103499 9/2019 - 8/2021
Title: "Regulation of Fibrosis via Cardiomyocyte-Fibroblast Interactions and Desmosomal Signaling"
Role: Co-I (PI: Adi Dubash, Furman University)
Total Award Funds: $150,000 Direct Funds to WJR group: $40,000

South Carolina EPSCoR/IDEA Stimulus Research Program Grant 4/2018 - 3/2020
Title: "Data-Driven Optimization of Bioengineering Vascular Scaffolds as an Advanced Material for Small Diameter Blood Vessel Replacement"
Role: Co-I (PI: Wayne Carver, University of South Carolina)
Total Award Funds: $300,000 Direct Funds to WJR group: $75,000

AHA Scientist Development Grant 17SDG33410658 1/2017 - 12/2019
Title: "Mechano-adaptive Fibrosis Signaling for Post-Infarct Therapy"
Role: PI
Total Award Funds: $231,000 Direct Funds to WJR group: $210,000

NIH (NIGMS) COBRE P20 GM103444 10/2016 - 11/2018
Center Title: "South Carolina Bioengineering Center of Regeneration and Formation of Tissues"
Project Title: "Modeling Chemo-Mechano-Signaling Interactions in Cardiac Fibroblasts"
Role: Pilot-project PI (Center PI: Naren Vyavahare, Clemson University)
Total Award Funds: $11,067,682 Direct Funds to WJR group: $200,000

NSF EPSCoR RII Track-1 EPS-0903795 3/2016 - 6/2016
Title: "The South Carolina Project for Organ Biofabrication"
Role: Co-I (PI: Prakash Nagarkatti, University of South Carolina)
Total Award Funds: $9,029,853 Direct Funds to WJR group: $100,000

AHA Mid-Atlantic Affiliate Postdoctoral Fellowship 14POST20460271 7/2014 - 12/2015
Title: "Multi-scale Modeling of Cardiac Fibroblast Mechanobiology"
Role: PI
Total Award Funds: $86,000 Direct Funds to WJR group: $86,000

NIH (NHLBI) NRSA Postdoctoral Fellowship 1F32HL126281-01 Awarded & Declined 2014
Title: "Multi-scale Modeling of Cardiac Fibroblast Mechanobiology"
Role: PI
Total Award Funds: $53,282 Direct Funds to WJR group: $53,282

NIH (NHLBI) Training Grant T32HL007284 9/2012 - 7/2014
Title: "Basic Cardiovascular Research Training Grant"
Role: Postdoctoral Trainee (Training Center PI: Gary Owens, University of Virginia)
Total Award Funds: $17,373,900 Direct Funds to WJR group: $85,000

MEMBERSHIPS & SERVICE

Journal Reviewer 2015 - present
Acta Biomaterialia; American Journal of Physiology - Heart and Circulatory Physiology; Cells; Computer Methods in Biomechanics and Biomedical Engineering; Frontiers in Bioengineering and Biotechnology; Integrative Biology; J Biomechanical Engineering; J Biomedical Materials Research: Part B - Applied Biomaterials; J Molecular and Cellular Cardiology; Mathematical Medicine and Biology; PLOS Computational Biology; Scientific Reports

National Institutes of Health
R15 peer review panelist 2020

National Science Foundation (NSF)
Peer review panelist 2017

American Heart Association 2016 - present
AIREA peer review panelist 2017 - 2020
Bioengineering-Basic Science (BSc3) peer review panelist 2016 - 2017

American Society of Mechanical Engineers - Bioengineering Division 2009 - present

SB^3 Conference Organizing Committee (Exhibits Chair)	2021 - 2022
Tissue and Cellular Engineering Committee	2013 - present
Emerging Topics Chair	2021 - present
Education Committee	2013 - present
Abstract reviewer, Summer Bioengineering Conference (now SB^3C)	2013 - present
B.S./M.S. poster judge, Summer Bioengineering Conference (now SB^3C)	2013 - 2017
Session chair, SB^3C	2016, 2021
Session chair, World Congress of Biomechanics	2014
Trainees Advisory Committee, Bioengineering Division	2009
Biomedical Engineering Society (BMES)	2010 - present
Abstract reviewer, Annual Meeting	2014 - present
Session chair, Annual Meeting	2017, 2018, 2021
American Society for Matrix Biology	2016 - present
Symposium Organizer and Chair, "Matrix Math" eSymposium (172 registrants)	2021
Tau Beta Pi Honors Engineering Society	2006 - present
Faculty mentor, Clemson University chapter	2016 - present
Engineering World Health (EWH)	2010 - 2012
Founding member, TAMU chapter	2010
Engineers Without Borders (EWB)	2008 - 2010
Costa Rica Construction Project Committee, TAMU chapter	2010
Fundraising Committee, TAMU chapter	2009 - 2010
Clemson University Service	
Department of Bioengineering	
Diversity & Inclusion Task Force	2018 - present
Graduate Program Committee	2016 - present
Design Executive Leadership Team	2016 - 2018
Biomedical Data Science & Informatics Program	
Executive Committee	2020 - present
Student Progress Committee	2019 - present
- Chair 2020-2021	
Systems Biology Working Group	
Co-Founder & Executive Committee	2018 - present
Biophysics Research Experience for Undergraduates (NSF REU)	
Executive Committee	2018 - 2019

INVITED TALKS

University of Wisconsin, Computing in Engineering Forum — September 2021
"Systems Mechanobiology Modeling to Predict & Control Cardiac Fibrosis"

National Institutes of Health, Matrix Biology Special Interest Group Seminar Series — April 2021
"Systems Mechanobiology Modeling to Predict & Control Cardiac Fibrosis"

Furman University, Cultural Life Program Seminar Series — April 2021
"Computers & Medicine & You: how computational modeling can advance personalized healthcare"

University of Arkansas, Biomedical Engineering Seminar Series — January 2020
"Systems Mechanobiology Modeling to Predict & Control Cardiac Fibrosis"

MADE in SC, NSF EPSCoR Annual Meeting — September 2019
"Integrated Simulation and Experimental Techniques for Heterogeneous Tissue Structures"

Virginia Commonwealth University, Mechanical Engineering Seminar Series — March 2019
"Multiscale Biomechanics and Mechanobiology of Cardiac Scar Tissue"

Medical University of South Carolina, Regenerative Medicine & Cell Biology Seminar Series — March 2019
"Signaling Network Models for Cardiac Fibrosis Prediction and Intervention"

Virginia Tech - Wake Forest University, School of Biomedical Engineering Seminar Series — January 2019
"Fibroblast Mechano-Signaling Models for Cardiac Fibrosis Prediction and Therapy"

University of Mississippi Medical Center, Center for Heart Research Seminar Series — April 2018
"Mechano-Adaptive Fibrosis Signaling for Post-Infarct Therapy Design"

University of South Carolina, Biomedical Sciences Seminar Series — April 2017
"Mechano-Adaptive Fibrotic Signaling & Computational Drug Screens"

Imperial College London, Bioengineering Seminar Series — February 2017
"Mechano-Adaptive Fibrotic Signaling & Computational Drug Screens"

Medical University of South Carolina, Global & Public Health Symposium — November 2016
Panelist, "Harnessing Technology & Public-Private Partnerships to Address Global Health Challenges"

Medical University of South Carolina, Fibrosis Seminar Series — September 2016
"Mechano-Adaptive Fibrotic Signaling & Computational Drug Screens"

Clemson University:

Biophysics Seminar — April 2021
"Multiscale Systems Biology of Cardiac Scar Tissue"

Biomedical Data Science & Informatics Program Seminar — March 2020
"Cell Signaling Network Modeling to Predict & Control Cardiac Fibrosis"

Common Call Symposium — March 2019
"Integrating Faith & Research"

International Biomaterials Symposium — April 2018
"Fibroblast Signaling Network Model for Post-Infarct Therapy Screens"

Eukaryotic Pathogens Innovation Center (EPIC) Seminar Series — November 2017
"Systems Modeling of Chagas-Related Cardiac Fibrosis"

Science on Tap Community Engagement Series — November 2017
"Computers & Medicine & You"

Professor/Undergrad Lunch Series for Education (PULSE) — March 2017
"Types of Academic Positions"

PROFESSIONAL OUTREACH

Emerging Scholars Program, Clemson University, Clemson, SC	2020 - present
Workshop instructor for "Design Thinking", Arusha Technical College, Arusha, Tanzania	2017 - 2018
ExxonMobil Bernard Harris Summer Science Camp, University of Virginia	2015
Student mentor and tutor, Milam Elementary School, Bryan, TX	2008 - 2010
Science fair judge, Harmony Science Academy, Bryan, TX	2009