

William B. Decker
2416 Parkway Drive
Winston-Salem, NC 27103

Office: 336-713-1226, Cell: 980-322-9108
wdecker@wakehealth.edu

EDUCATION

Virginia Tech – Wake Forest University, Winston-Salem, NC

M.S., School of Biomedical Engineering and Sciences (SBES) May 2018

Thesis: *Modular Use of Human Body Models of Various Complexities in the Head and Thoraco-Abdominal Regions*

Advisors: Dr. F. Scott Gayzik (Primary Advisor), Dr. Joel D. Stitzel,
Dr. Ashley Weaver

Virginia Tech – Wake Forest University Center for Injury Biomechanics

University of South Carolina at Columbia, Columbia, SC

B.S. Biomedical Engineering May 2015

CURRENT ACADEMIC TITLE

PhD Candidate

Expected Graduation: May 2020

Virginia Tech-Wake Forest Center for Injury Biomechanics (CIB)

Department of Biomedical Engineering

Wake Forest University School of Medicine, Winston-Salem, NC

RESEARCH OBJECTIVES

- To use computational modeling for injury biomechanics research to aid in injury prevention
- To complete a Ph.D. in Biomedical Engineering and continue on to an industry research position

HIGHLIGHTED SKILLS

- Computational biomechanics research: Dynamic nonlinear finite element analysis, analytical programming, and human body model development and validation
- Experimental biomechanics research: Quasi-static material testing, compression of tissue simulants, and data analysis

JOURNAL PUBLICATIONS

1. **Decker W**, Baker A, Ye X, Brown P, Stitzel J, Gayzik FS. Development and Multi-Scale Validation of a Finite Element Football Helmet Model. *Annals of Biomedical Engineering* (2019): 1-13.
2. **Decker W**, Koya B, Pak W, Untaroiu CD, Gayzik FS. Evaluation of finite element human body models for use in a standardized protocol for pedestrian safety assessment. *Traffic injury prevention* (2019) 1-5.
3. **Decker W**, Koya B, Davis ML, Gayzik FS. Modular use of human body models of varying levels of complexity: validation of head kinematics. *Traffic injury prevention* 18.sup1 (2017): S155-S160.
4. **Decker W**, Koya B, Davis ML, Gayzik FS. Quantitative evaluation of head motion kinematics between human body models of varying complexity. *Biomed Sci Instrum* (2016): 52:9.

PEER-REVIEWED CONFERENCE PAPERS

1. **Decker W**, Koya B, Gayzik FS. Validation of Detailed Organ Modularity in a Simplified Human Body Model. *IRCOBI Conference Proceedings* NO. IRC-18-59. 2018.
2. **Decker W**, Ye Xin, Baker A, Stitzel J, Gayzik FS. Short Communication: Comparison of CORA to Head Injury Biomechanical Metrics Using an American Football Helmet Model. *IRCOBI Conference Proceedings* NO. IRC-18-53. 2018.

SELECTED CONFERENCE ABSTRACTS AND SCIENTIFIC EXHIBITS

1. Schwartz D, Koya B, **Decker W**, Stitzel JD, Gayzik FS. "Modular Use of Validated Organs within a Simplified Human Body Finite Element Model Reduces Computational Cost." Accepted for poster presentation at the Biomedical Engineering Society Annual Meeting, Tampa FL, October 2015.
2. **Decker W**, Koya B, Davis ML, Gayzik FS. "Quantitative evaluation of head motion kinematics between human body models of varying complexity." Accepted for podium presentation at the Rocky Mountain Bioengineering Symposium, Denver CO, April 2016.
3. **Decker W**, Gayzik FS. "Head Kinematics in Human Body Models of Increasing Complexity vs Volunteer Data." Accepted for podium presentation at the Biomedical Engineering Society Annual Meeting, Minneapolis MN, October 2016.
4. **Decker W**, Koya B, Davis ML, Gayzik FS. "Modular use of human body models of varying levels of complexity: validation of head kinematics." Accepted for podium presentation at the Enhanced Safety of Vehicles Conference, Detroit MI, June 2017.
5. **Decker W**, Koya B, Gayzik FS. "Modular Use of Human Body Models of Varying Complexity for Thoracic Organs." Accepted for podium presentation at the Summer Biomechanics, Bioengineering, and Biotransport Conference, Tucson AZ, June 2017.
6. **Decker W**, Koya B, Guleyupoglu B, Gayzik FS. "A Modular Simplified Human Body Finite Element Model can Reduce Run-Time Requirements for Lower Extremity Impact Biomechanics Studies." Accepted for poster presentation at the Biomedical Engineering Society Annual Meeting, Phoenix AZ, October 2017.
7. **Decker W**, Koya B, Gayzik FS. "Validation of Detailed Organ Modularity in a Simplified Human Body Model." Accepted for podium presentation at the Southern Biomedical Engineering Conference, Charlotte NC, March 2018.
8. **Decker W**, Koya B, Gayzik FS. "Modular Incorporation of Detailed Lower Extremity into Simplified Human Body FE Model." Accepted for podium presentation at the Injury Biomechanics Symposium at The Ohio State University, May 2018.
9. **Decker W**, Koya B, Gayzik FS. "Use of Finite Element Human Body Models in a Standardized Evaluation Protocol for Pedestrian Safety Assessment." Accepted for podium presentation at the World Congress of Biomechanics, Dublin Ireland, July 2018.

10. **Decker W**, Koya B, Gayzik FS. “Validation of Detailed Organ Modularity in a Simplified Human Body Model.” Accepted for podium presentation at the International Research Council on Biomechanics of Injury Europe, Athens Greece, September 2018.
11. **Decker W**, Ye X, Backer A, Stitzel J, Gayzik FS. “Comparison of CORA to Head Injury Biomechanical Metrics Using an American Football Helmet Model.” Accepted for short communications paper at the International Research Council on Biomechanics of Injury Europe, Athens Greece, September 2018.
12. **Decker W**, Koya B, Tushak S, Shin J, Choi HY, Gayzik FS. “Application of the EuroNCAP Pedestrian Protocol using the GHBM Family of Pedestrian Models: Verification across Three Dynamic FEA Solvers.” Accepted for podium presentation at the CARHS Human Modeling and Simulation in Automotive Engineering, Berlin Germany, October 2018.

TECHNICAL REPORTS AND MEETINGS

- Prepared quarterly reports to GHBM sponsor (Aug 2015 – Current)
- Prepared and presented bi-weekly updates to Biocore sponsor on the development of a finite element football Helmet model (Mar 2017 – Mar 2018)
- Lecture given on finite element analysis on 1/24/2018

PROFESSIONAL MEETINGS AND TRAININGS

1. LS-DYNA Training, Winston-Salem, NC, September 2015
2. LS-DYNA Materials Training, Winston-Salem, NC, November 2015

RESEARCH AND WORK EXPERIENCE

Graduate Research Assistant

School of Biomedical Engineering and Sciences Aug. 2015 – Present
Virginia Tech – Wake Forest Center for Injury Biomechanics, Winston-Salem, NC

Computational Modeling

1. Development and validation of the Global Human Body Model Consortium’s mid-sized male FE model
2. Development and validation of the Global Human Body Model Consortium’s mid-sized male simplified FE model
3. Development of modular method for the mid-sized male simplified FE model
4. Development and validation of the Wake Forest University Schutt Air XP FE model

Summer Intern

Partnership for Dummy Technologies and Biomechanics May 2015 – August 2015
 Ingolstadt, Germany

1. Compared various finite element human body models through structural test setups
2. Aided in the development of a finite element functioning elbow joint model

Undergraduate Research Assistant

University of South Carolina May 2013 – May 2014
Biomedical Engineering Department, Columbia, SC

1. Three-dimensionally modeled atherosclerotic plaque of carotid arteries of both mice and humans
2. Analyzed the reconstructed plaques' effect on intimal fluid mechanics through finite element analysis using Comsol.

HONORS AND AWARDS

Ohio State University Injury Biomechanics Symposium May 2018
Student Travel Award

Rocky Mountain Bioengineering Symposium April 2016
Anthony Sances Jr. Award of Merit

University of South Carolina Undergraduate Awards
Magellan Scholar: May 2013-May 2014
Student research grant

COMPUTER SKILLS

Programming Languages:	Matlab
Dynamics / Simulation Software:	LS-Dyna, Comsol
FEA Pre/Post Processing Software:	LS-PrePost, Hyperworks, Oasys, Ansa
Image Analysis Software:	Mimics, Amira
CAD:	Rhinoceros, Geomagic Studio, Solidworks

PROFESSIONAL MEMBERSHIPS

Biomedical Engineering Society	2015 – Present
Treasurer, VT – Wake Forest Chapter	2017 – Present

REFERENCES

F. Scott Gayzik, Ph.D.
Department of Biomedical Engineering
Wake Forest University School of Medicine
Medical Center Boulevard
Winston-Salem, NC 27157-1022
336.716.6643
sgayzik@wakehealth.edu

Joel D. Stitzel, Ph.D.
Department of Biomedical Engineering
Wake Forest University School of Medicine
Medical Center Boulevard
Winston-Salem, NC 27157-1022
336.716.5597

jstitzel@wakehealth.edu