



Exponent[®]
Engineering & Scientific Consulting

Andrea Robinson, Ph.D.

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Professional Profile

Dr. Andrea Robinson specializes in injury biomechanics and computational modeling, with expertise in the evaluation of biomechanical response in impact events such as motor vehicle collisions. Her work combines engineering analysis, human body modeling, and evaluation of medical imaging to understand how characteristics like anthropometry influence injury potential. At Exponent, she investigates injury causation and biomechanical factors associated with vehicle crashes, slips, trips, falls, and other incidents involving human injury.

Dr. Robinson's technical expertise includes finite element analysis, medical image processing, large-scale data analytics, and high-performance computing. She has developed automated workflows for extracting quantitative anatomical measurements from medical images and for analyzing large population datasets. Her experience includes computational simulation using LS-DYNA, development of image-analysis tools in MATLAB and Python, and statistical evaluation of anatomical variability.

Prior to joining Exponent, Dr. Robinson was a Graduate Research Assistant in the Center for Injury Biomechanics at Wake Forest University. Her doctoral research examined the relationship between rib cage morphology and thoracic injury risk. She developed subject-specific thorax models from computed tomography imaging and evaluated injury outcomes in motor vehicle collisions across large virtual populations.

Academic Credentials & Professional Honors

Ph.D., Biomedical Engineering, Wake Forest University, 2026

B.S., Physics, Davidson College, 2021

2nd Place 3MT Competition, Wake Forest School of Medicine, 2026

Alumni Student Travel Grant, Wake Forest School of Medicine, 2024

National Science Foundation Graduate Research Fellowship, 2023-2026

Tavel Grant, International Resource Council on Biomechanics of Injury, 2022

National GEM Consortium Employer Fellow 2021

Outstanding Service Award, Society of Physics Students, 2021

Prior Experience

Graduate Research Assistant, Center for Injury Biomechanics, Wake Forest University, 2021-2026

GEM Employer Fellow, Johns Hopkins University Applied Physics Lab, 2021

Undergraduate Research Assistant, Nuclear Physics Lab, Davidson College, 2020-2021

Summer Research Intern, Center for Injury Biomechanics, Wake Forest University, 2020

Summer Research Intern, Visual Motor Laboratory, East Carolina University, 2019

Professional Affiliations

Biomedical Engineering Society

Publications

Kalmar Gonzalo A, Von Kleeck W, Robinson A, Koya B, Gayzik FS. [Evaluating submarining in female human body models: predicting occurrence and timing through biomechanics and restraint metrics. Traffic Injury Prevention 2025; 1–10.](#)

[Robinson A, Zheng B, von Kleeck III BW, Tan J, Gayzik FS. Holistic shape variation of the rib cage in an adult population.](#) Frontiers in Bioengineering & Biotechnology – Biomechanics 2024; 12:1432911.

Robinson A, Zheng B, von Kleeck III BW, Tan J, Gayzik FS. [Comparison of individual rib cage shape variation with regression predictions.](#) In Proceedings of the International Research Council on the Biomechanics of Injury. Stockholm, Sweden, September 2024.

Robinson A, von Kleeck III BW, Gayzik FS. [Development and preliminary validation of computationally efficient and detailed 50th percentile female human body models.](#) Accident Analysis & Prevention 2023; 190:107182.

Robinson A, Efobi S, Moore A, Aira J, Lenchik L, Weaver AA, Hsu F, Hallman J, Gayzik FS. [The effect of posture on subcutaneous adipose tissue: a preliminary imaging study.](#) In Proceedings of the International Research Council on the Biomechanics of Injury. Porto, Portugal, September 2022.

Presentations

Robinson A, Wills A, Gayzik FS. Subject-specific variation in injury response of the thorax. Oral presentation, International Research Council on the Biomechanics of Injury, Munich, Germany, 2026.

Robinson A, Wills A, Kalmar-Gonzalo A, Gayzik FS. Integration of subject-specific rib cages in human body models for injury analysis. Oral presentation, World Congress on Computational Mechanics - European Congress on Computation Methods in Applied Sciences and Engineering, Munich, Germany, 2026.

Robinson A, Wills A, Gayzik FS. Influence of natural human variation on the biomechanical and injury response of the thorax. Oral presentation, VT-WF SBES Annual Symposium, Winston-Salem, NC, 2026.

von Kleeck III BW, Robinson A, Gayzik FS. Identifying submarining in small female human body models compared to reference PMHS tests via a quantitative approach. Oral presentation, CARHS – Human Modeling and Simulation in Automotive Engineering, Marburg, Germany, 2024.

Robinson A, Zheng B, von Kleeck III BW, Tan J, Gayzik FS. Comparison of individual rib cage shape

variation with regression predictions. Oral presentation, International Research Council on the Biomechanics of Injury, Stockholm, Sweden, 2024.

Robinson A, Zheng B, von Kleeck III BW, Tan J, Gayzik FS. Development of an automated pipeline to characterize full rib cage shape variability. Poster presentation, The Ohio State University Injury Biomechanics Symposium, Vancouver, British Columbia, 2024.

Robinson A, Zheng B, von Kleeck III BW, Gayzik FS. Development and preliminary validation of computationally efficient and detailed 50th percentile female human body models. Oral presentation, Association for the Advancement of Automotive Medicine, Indianapolis, IN, 2023.

Robinson A, Zheng B, von Kleeck III BW, Gayzik FS. Development and preliminary validation of computationally efficient and detailed 50th percentile female human body models. Oral presentation, Association for the Advancement of Automotive Medicine, Indianapolis, IN, 2023.

Robinson A, Aira J, Gayzik FS. The effect of posture on rib cage morphology. Oral presentation, Biomedical Engineering Society Annual Meeting, San Antonio, TX, 2022.

Robinson A, Efobi S, Moore A, Aira J, Lenchik L, Weaver AA, Hsu F, Hallman J, Gayzik FS. The effect of posture on subcutaneous adipose tissue: a preliminary imaging study. Oral presentation, The Ohio State University Injury Biomechanics Symposium, Columbus, OH, 2022.

Robinson A, AlMania J, Murray N. Virtual reality as a means for concussion testing. Poster presentation, East Carolina University Summer Research Symposium, Greenville, NC, 2019. Received People's Choice Award.

Additional Education & Training

Mentorship Training and Diversity Workshop - WF Office of Postdoctoral Education 2024

LS-DYNA Finite Element Analysis and Simulation Training - WF Center for Injury Biomechanics 2022

Peer Reviews

Reviewer for Frontiers in Bioengineering & Biotechnology