

SHENG CHEN

PhD

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BIOMECHANICS

EDUCATION

MICHIGAN STATE UNIVERSITY

PhD Mechanical Engineering 2019

BEIJING JIAOTONG UNIVERSITY

MS Mechanical Engineering 2014

BS Mechanical Engineering 2011

AFFILIATIONS

Biomedical Engineering Society

PROFESSIONAL PROFILE

Dr. Sheng Chen is a biomechanical scientist with extensive experience analyzing injuries related to motor vehicle collisions, ATV rollovers, slips and falls, and falling object impacts. He provides expert analysis for legal and industrial clients, leveraging biomechanical principles to evaluate how injuries occur and assess the factors contributing to injury risk. His expertise includes human kinematics, force application, injury causation, and biomechanical modeling and simulation across a wide range of real-world scenarios.

Dr. Chen's academic background is in computational and experimental soft tissue biomechanics, with emphasis on nonlinear elastic behavior and anisotropic properties of biological tissues. His research focused on developing robust methodologies for optimizing computational models using experimental data, and on building connections between mechanical behavior of soft tissues and their underlying microstructure.

AREAS OF EXPERTISE

Biomechanics
Human Injury Tolerance
Human Kinematics
Biomechanical Modeling and Simulation

EXPERIENCE

Explico

2025 - Present *Senior Scientist*

Exponent

2025 *Senior Associate*

2022 - 2024 *Associate*

Michigan State University

2019 - 2021 *Postdoctoral Research Associate*

2015 - 2019 *Graduate Research Assistant*

2014 - 2015 *Graduate Teaching Assistant*

PEER-REVIEWED PUBLICATIONS

Chen S, Routzong MR, Abramowitch SD, Grimm MJ. A computational procedure to derive the curve of Carus for childbirth computational modeling. *Journal of Biomechanical Engineering*. 2022;145(011002).

Chen S, Grimm MJ. Childbirth computational models: characteristics and applications. *Journal of Biomechanical Engineering*. 2021;143(5):050801.

Chen S, Scott J, Bush TR, Roccabianca S. Inverse finite element characterization of the human thigh soft tissue in the seated position. *Biomechanics and Modeling in Mechanobiology*. 2020;19(1):305–16.

Chen S, Ní Annaidh A, Roccabianca S. A microstructurally inspired constitutive model for skin mechanics. *Biomechanics and Modeling in Mechanobiology*. 2020;19(1):275–89.

Upchurch DA, Wang Y, Chen S, Roccabianca S, Roush JK. Assessment of time to completion, number of errors, and knot-holding capacity of square knots and Aberdeen knots tied by veterinary students and student perceptions of knot security and knot-tying difficulty. *Journal of the American Veterinary Medical Association*. 2020;256(2):230–8.

Scott J, Chen S, Roccabianca S, Bush TR. The effects of body position on the material properties of soft tissue in the human thigh. *Journal of the Mechanical Behavior of Biomedical Materials*. 2020;110:103964.

Sadler Z, Scott J, Drost J, Chen S, Roccabianca S, Bush TR. Initial estimation of the in vivo material properties of the seated human buttocks and thighs. *Internal Journal of Non-linear Mechanics*. 2018;107:77–85.

Bula E, Upchurch DA, Wang Y, Chen S, Roccabianca S. Comparison of tensile strength and time to closure between an intermittent Aberdeen suture pattern and conventional methods of closure for the body wall of dogs. *American Journal of Veterinary Research*. 2018;79(1):115–23.

PRESENTATIONS AND PEER-REVIEWED ABSTRACTS

Chen S, Routzong M, Abramowitch S, Grimm MJ. Modeling of childbirth – coccyx rotation with improved biofidelity of fetal head and delivery path. Biomedical Engineering Society (BMES) Annual Meeting. Orlando, FL. 2021.

Chen S, Routzong M, Abramowitch S, Grimm MJ. The effects of fetal head size on maternal coccyx rotation during a vaginal delivery. Summer Biomechanics, Bioengineering, Biotransport Conference (SB3C). Virtual 2021.

Chen S, Grimm MJ. Reducing delivery force and brachial plexus stretch during shoulder dystocia by combined maneuvers. Biomedical Engineering Society (BMES) Annual Meeting. Virtual. 2020.

Chen S, Grimm MJ. A computational study of effects of commonly used obstetrical maneuvers on fetal brachial plexus stretch during a shoulder dystocia event. Summer Biomechanics, Bioengineering, Biotransport Conference (SB3C). Virtual. 2020.

Chen S, Broemer E, Scott J, Bush TR, Roccabianca S. A nonlinear finite element model of human thigh with high anatomical and mechanical fidelity. Engineering Graduate Research Symposium. East Lansing, MI. 2019.

Chen S, Broemer E, Scott J, Bush TR, Roccabianca S. Development and validation of a nonlinear human thigh finite element model. Midwest American Society of Biomechanics (ASB) Regional Meeting. Dayton, OH. 2019.

Chen S, Scott J, Bush TR, Roccabianca S. Non-linear finite element model of thigh soft tissue mechanical behavior informed by in vivo experimental data. Biomedical Engineering Society (BMES) Annual Meeting. Atlanta, GA. 2018.

Chen S, Scott J, Bush TR, Roccabianca S. A subject specific model of the human thigh informed by in vivo experimental data. 8th World Congress of Biomechanics. Dublin, Ireland. 2018.

Chen S, Scott J, Bush TR, Roccabianca S. Determination of the proper constitutive model for a subject specific FE model of the human thigh. Engineering Graduate Research Symposium. East Lansing, MI. 2018.

Chen S, Scott J, Bush TR, Roccabianca S. A subject specific model of the human thigh informed by in vivo experimental data. ICHITA-WM IT Forum Joint Conference. Kalamazoo, MI. 2017.

Chen S, Roccabianca S. Determination of proper storage condition and constitutive model for rat back skin mechanical properties. Summer Biomechanics, Bioengineering, Biotransport Conference (SB3C). Tucson, AZ. 2017.

PhD

Chen S, Roccabianca S. Effect of storage condition, orientation, location, and gender on rat back skin mechanical properties. Engineering Graduate Research Symposium. East Lansing, MI. 2017.

Chen S, Roccabianca S. Effect of storage condition, orientation, location, and gender on rat back skin mechanical properties. 9th Annual Graduate Academic Conference. East Lansing, MI. 2017.

Chen S, Roccabianca S. Effect of storage condition, orientation, location, and gender on rat back skin mechanical properties. Midwest American Society of Biomechanics (ASB) regional meeting. Grand Rapids, MI. 2017.

Chen S, Ní Annaidh A, Roccabianca S. Micro-structurally motivated constitutive model for human skin. Summer Biomechanics, Bioengineering, Biotransport Conference (SB3C). National Harbor, MD. 2016.

Chen S, Ní Annaidh A, Roccabianca S. Micro-structurally motivated constitutive model for human skin. Engineering Graduate Research Symposium. East Lansing, MI. 2016.

PROFESSIONAL DEVELOPMENT

Northwestern University Center for Public Safety

Traffic Crash Reconstruction for Engineers, 2022

Siemens Digital Industries Software

MADYMO Introduction Training, 2022