



Exponent®
Engineering & Scientific Consulting

Mukui Mutunga, Ph.D.

Associate | Biomechanics

Philadelphia

+1-215-594-8859 tel | mmutunga@exponent.com

Professional Profile

Dr. Mutunga offers expertise in human movement and injury mechanics. At Exponent she has investigated injury risks associated with motor vehicle collisions, and slips, trips, and falls from various heights. She has experience collecting biomechanical data using high-speed motion capture, inertial measurement units (IMUs), and pressure measuring sensors and analyzing it using MATLAB and R/R Studio. Dr. Mutunga's training also includes data analysis using categorical, linear, and multivariate methods. In addition, she has familiarity with parsing and analyzing data from national databases like the National Automotive Sampling System Crashworthiness Dataset (NASS-CDS), and Crash Investigation Sampling System (CISS).

Dr. Mutunga obtained her Ph.D. in Bioengineering at the University of Kansas, Lawrence, and a graduate certificate in Applied Statistics from the University of Kansas Medical Center. Her graduate work involved identifying changes to upper-trunk, trunk, pelvis, and hip rotations and coordination patterns in runners with and without a history of low-back pain and unilateral lower-limb amputees. Her work aimed to identify changes to movement patterns that could predispose these populations to future incidents of low-back pain. In addition, she conducted a comparative analysis of methods used to characterize coordination patterns. Due to her graduate work, Dr. Mutunga is proficient in experimental design and testing procedures for biomechanical analysis that involve human subjects.

Academic Credentials & Professional Honors

Ph.D., Bioengineering, University of Kansas, 2022

M.S., Bioengineering, University of Kansas, 2019

B.S., Biomedical Engineering, Robert Morris University, 2014

Madison & Lila Self Graduate Fellowship, 2017 – 2021

Prior Experience

Graduate Research Assistant, Human Performance Laboratory, University of Kansas Medical Center, 2021 – 2022

Graduate Research Assistant, Human Motion Control Laboratory, University of Kansas, 2016 – 2022

Post-baccalaureate Research Education Program, University of Kansas, 2015 – 2016

Publications

Presentations

Mutunga SM, Stewart J, Kingsbury T, Wilson SE. Characterization of upper-torso, torso and pelvic rotations and coordination patterns in runners with unilateral lower-limb amputation. Oral presentation, University of Nebraska's Human Movement and Variability, and Great Plains Biomechanics Conference, Omaha, NE (Online), 2021.

Mutunga SM, Sharma N, Loudon, JK, Huisinga J, Bruetsch A, Wilson SE. Trunk, lumbar, and pelvic coordination patterns in runners with and without a history low-back pain. Poster presentation, International Society of Biomechanics/American Society of Biomechanics, Calgary, Canada, 2019

Jardon V, Mutunga SM, Wilson SE. Generation of unexpected loads through a mechanical device for lifting studies. Oral presentation, International Society of Biomechanics/American Society of Biomechanics, Calgary, Canada, 2019

Mutunga SM, Sharma N, Loudon, JK, Huisinga J, Bruetsch A, Wilson SE. Trunk, lumbar, and pelvic kinematics of runners with and without low-back pain. Poster presentation, World Congress of Biomechanics. Dublin, Ireland, 2018

Additional Education & Training

Graduate Certificate in Applied Statistics, University of Kansas Medical Center, 2020