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Engineering & Scientific Consulting

Meredith Wells, Ph.D.

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Professional Profile

Dr. Wells' areas of expertise include the biomechanical analysis of sports and rehabilitation, and the biomechanical and perceptual changes associated with orthotic footwear. She has over ten years of hands-on experience in kinetic, kinematic, and musculoskeletal research and analysis. Specifically, Dr. Wells has studied the biomechanics of downhill running and ballroom dance, motor control strategies in older adult and clinical populations, and orthotic interventions.

Dr. Wells has designed and conducted a variety of innovative research protocols that included the use of high-speed motion capture systems (Vicon, OptiTrack), force plates and force-instrumented treadmills (AMTI), electromyography (Delsys, Noraxon), isokinetic dynamometry (Biodex, Cybex), and inertial sensors (Opals) to assess movement.

Dr. Wells has investigated the effect of grade on the kinetics, kinematics, and electromyographical activity when running downhill at different grades compared to a level surface. She also explored the biomechanical differences in common rhythm movement patterns across ballroom and swing dancers of different skill levels. Additionally, Dr. Wells evaluated the feasibility of using a novel robotic physical therapy system to improve mobility and motor control in individuals with Parkinson's disease with the long-term goal of in-home utilization. She also assessed variations in step strategy of older adults with and without mild cognitive impairment when completing the Four-Square Step Test.

Prior to joining Exponent, Dr. Wells was the Biomechanics Researcher for Superfeet Worldwide where she led the biomechanical research, performance analysis, and wear testing programs to examine the role of various insole structures and materials on kinematics and comfort across a range of populations from recreational to semi-professional.

As a former competitive swimmer and current ballroom dancer, Dr. Wells can leverage her athletic experience combined with her technical and research background to provide unique insight to human movement analysis, injury risk assessment, and performance enhancement.

Academic Credentials & Professional Honors

Ph.D., Kinesiology, Georgia State University, 2022

M.S., Biomechanics, Ball State University, 2017

B.S., Exercise Science, Ithaca College, 2015

Kinesiology and Health Outstanding Doctoral Dissertation Award, 2023

Center for Health in Aging Grant, 2023

Kinesiology & Health Outstanding Doctoral Student Award, 2022

American Society of Biomechanics Grant-in-Aid Finalist, 2021

Provost's Dissertation Fellowship, 2021

Featured in College of Education & Human Development's magazine of Research &Innovation, 2020

Doctoral Dissertation Grant, 2020

Georgia State University Dean's Doctoral Research Fellowship, 2017-2021

Student Symposium Keys/Litten/Smith Award, 2017

Ball State University Scholar Merit Fellowship, 2015-2017

Ball State University Aspire Student Research Grant, 2016

Prior Experience

Biomechanics Researcher, Superfeet Worldwide LLC, 2023-2025

Postdoctoral Research Fellow, Emory University School of Medicine, 2022-2023

Doctoral Research Fellow, Georgia State University, 2017-2022

Swim Coach, Spartans Aquatic Club, 2018-2021

Unit Administrator, Ball Memorial Hospital, 2016-2017

Graduate Researcher, Ball State University, 2015-2017

Professional Affiliations

American Society of Biomechanics, 2017-2023

International Society of Biomechanics, 2018, 2022

American College of Sports Medicine, 2018

Publications

Wells MD, Hackney ME, Yang F. (2025). Effect of dance experience on loading patterns among ballroom dancers. Sports Biomechanics.

Lamsey M, Wells MD, Hamby L, Scanlon PE, Siddiqui R, Tan YL, Feldman J, Kemp CC, Hackney ME. (2025). Exercise specialists' evaluation of robot-led rehabilitative exercise for people with Parkinson's disease. MDPI Healthcare.

Schornstein BJ, Wells MD, Dickin DC, Jutte LS, Wang H. (2025). Biomechanical adjustments during an exhaustive treadmill run: Comparison of compression tights and running shorts. Sports Biomechanics.

Wells MD, Dickin DC, Popp J, Wang H. (2025). Sagittal plane joint mechanics during downhill running in female distance runners. Sports Medicine and Health Science.

Kazanski ME, LaFollette CE, Wells MD, Rosenberg MC, McKay JL, Hajjar I, Hackney ME. (2025). Mild cognitive impairment is associated with reduced dynamic balance performance and altered lower-extremity kinematics during the Four-Square Step Test. Journal of Geriatric Physical Therapy.

Higgins S, Dickin DC, Hankemeier D, Wells MD, Wang H. (2025). The effect of incline walking on lower extremity and trunk mechanics in older adults. Sports Medicine and Health Science, 7(1):56-60.

Simpkins C, Ahn J, Buehler R, Ban R, Wells M, Yang F. (2023). Commingling effects of anterior load and walking surface on dynamic gait stability in young adults. Journal of Applied Biomechanics, 40(1): 66-72.

Edwards NA, Dickin DC, Walker SE, Wells MD, Wang H. (2023). Swing kinematics, pelvis and trunk sequencing, and lower extremity strength in golfers with and without a history of low back pain. Annals of Sports Medicine and Research, 10(4): 1214.

Wells MD, Morse A, Barter J, Mammino K, Bay A, Hackney ME. (2023). Walk with me hybrid virtual/in-person walking for older adults with neurodegenerative disease. Journal of Visualized Experiments (196), e62869.

Wells MD, Yang F. (2022). The triple step in recreational swing dancers: A kinematic analysis. International Journal of Exercise Science, 15(1): 1492-1505.

Wells M, Yang F. (2021). Ballroom dance as a form of rehabilitation: A systematic review. MDPI: Biomechanics, 1(3): 307-320.

Wells M, Yang F. (2021). A kinetic analysis of the triple step in swing dancers. Sports Biomechanics.

Wells MD, Dickin DC, Popp J, Wang H. (2018). Effect of downhill running grade on lower extremity loading in female distance runners. Sports Biomechanics, 19(3): 333-341.

Calo M, Anania T, Bello J, Cohen V, Stack S, Wells MD, Belyea B, King D, Medina McKeon J. (2019). Reliability of using an iPad to analyze lower extremity landing mechanics during drop vertical jumps. International Journal of Athletic Therapy & Training, 24(2), 70-77.

Presentations

Lamsey M., Tan YL., Wells MD., Beatty M, Liu Z., Majumdar A., Washington K., Feldman J., Kuppuswamy N., Nguyen E., Wallenstein A., Hackney ME., Kemp CC. (2023). Stretch with Stretch: Physical Therapy Exercise Games Led by a Mobile Manipulator. 2024 IEEE International Conference on Robotics and Automation.

Wells MD., Feldman J., Lamsey M., Nguyen E., Tan Y., Wallenstein A., Kemp C., Hackney M. Feasibility and initial effects of one session of robot-assisted therapeutic exercises for people with Parkinson's disease: A pilot study. 100th Annual Meeting of the American Congress of Rehabilitation Medicine, Atlanta, GA. October 2023. (Poster Presentation).

Wells MD., Yang F. External forces during the American Rumba box step across three dance levels. 46th Annual Meeting of the American Society of Biomechanics, Knoxville, TN. August 2023. (Poster Presentation).

Hackney ME., Wells MD., LaFollette C., Kazanski ME., Rosenberg M. Biomechanics distinguish people with vs without mild cognitive impairment during motor-cognition tests. 46th Annual Meeting of the American Society of Biomechanics, Knoxville, TN. August 2023. (Poster Presentation).

Wells MD., Simpkins C, Yang F. External loading during the rock step in three levels of ballroom dancers. North American Congress on Biomechanics, Ottawa, Canada. August 2022. (Poster Presentation).

Wells MD., Yang, F. Frontal plane kinematics of the triple step in swing dancers. Virtual 45th Meeting of the American Society of Biomechanics. August 2021. (Poster Presentation).

Wells MD., Yang, F. Sagittal plane kinematics of partnered and individual triple steps in swing dancing. XXVIII Congress of the International Society of Biomechanics, virtual. July 2021. (Poster Presentation).

Simpkins C., Ahn J., Wells M., Yang F. Dynamic gait stability during anteriorly loaded treadmill walking. XXVIII Congress of the International Society of Biomechanics, virtual. July 2021. (Poster Presentation).

Wells MD., Yang, F. A biomechanical analysis of the triple step in recreational swing dancers. 44th Annual Meeting of the American Society of Biomechanics, Virtual. August 2020. (Podium presentation).

Wells MD., Geil M., Safaeepour Z., Yang F. Quantification of vaulting in healthy adults walking with an immobilized knee. XXVII Congress of the International Society of Biomechanics, Calgary, Alberta, Canada. July 2019. (Poster presentation).

Wells MD., Wang H. Effect of grade on joint mechanics during downhill running in female distance runners. 43rd Annual Meeting of the American Society of Biomechanics, Rochester, MN. August 2018. (Poster presentation).

Wells MD., Dickin DC., Popp J., Wang H. Effect of grade on the biomechanics of downhill running in female distance runners. 42nd Annual Meeting of the American Society of Biomechanics, Boulder, CO. August 2017. (Poster presentation).

King D., Anania T., Bello J., Calo M., Cohen V., Stack S., Wells MD., Belyea B., McKeon J. Reliability of mainstream tablets for 2D analysis of a drop jump. Mid-Atlantic Regional Chapter of the American College of Sports Medicine 39th Annual Meeting, Harrisburg, PA. November 2016.

Anania T, Bello JD, Calo MM, Cohen VA, Stack SC, Wells MD, Belyea B, King DL, Medina McKeon JM. Sagittal plane hip and knee displacement during a drop vertical jump is highly correlated as captured by handheld tablets. National Conference on Undergraduate Research, Asheville, NC. April 2016.

Peer Reviews

Revista Brasileira de Ciências do Esporte

Research Quarterly for Exercise and Sport

Journal of Biomechanics

Frontiers in Psychology