

Exponent®
Engineering & Scientific Consulting

Danielle Stramel, Ph.D.

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Professional Profile

Dr. Stramel is an expert in the field of biomechanics and in the development and utilization of robotic platforms to study human movement and mechanics. Dr. Stramel conducts biomechanical assessments of motor vehicle, recreational, and occupational accidents for injury risks and mechanics. She also provides test design, analysis and study support for the biomechanical evaluation of product performance.

Dr. Stramel has extensive experience in the development and control of electromechanical systems and in the use of multimodal sensor arrays, including force and pressure transducers, inertial measurement units (IMUs), electromyography (EMG), and motion capture (MoCap) systems. She also has broad experience in designing and conducting user studies with diverse demographics, including healthy adults, stroke survivors, and children with Cerebral Palsy, to evaluate varied facets of the dynamics of human movement. Dr. Stramel has a keen understanding of the delicate interplay between these platforms and individuals, using hands-on exploration to gain valuable insights.

Prior to joining Exponent, Dr. Stramel was a Graduate Research Assistant in the Robotics and Rehabilitation (ROAR) Lab at Columbia University. Her research focused on the use of a novel robotic platform to evaluate the changes in gait parameters with various force applications during movement to assist in the rehabilitation of locomotion in mobility-compromised individuals. Beyond her work in human-robot collaboration, she's skilled in mechatronics, CAD, and analyzing failure trends.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Columbia University, 2023

M.S., Mechanical Engineering, Columbia University, 2017

B.S., Mathematics and Mechanical Engineering, University of Central Florida, 2016

NSF S-STEM SEGUE Scholarship

Prior Experience

Teaching Assistant, Mechanical Engineering, Columbia University, 2021-2022

Graduate Research Assistant, Mechanical Engineering, Columbia University, 2017-2022

Mechatronics Engineer, Scent.io, 2017-2018

Research Lab Technician, Sciperio, 2015-2016

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Specialty Engineering – College Work Experience Program Student, Lockheed Martin and University of Central Florida, 2013-2015

Professional Affiliations

American Society of Mechanical Engineers (ASME)

Patents

US Patent Application US20200323727A1: Powered Walking Assistant and Associated Systems and Methods, April 2020 (Agrawal SK, Carrera RM).

Publications

Adeniyi, A., Stramel, DM, Rahman, D., Rahman, M., Yadav, A., Zhou, J., ... & Agrawal, S. K. Utilizing Mobile Robotics for Pelvic Perturbations to Improve Balance and Cognitive Performance in Older Adults: A Randomized Controlled Trial. Scientific Reports 2023; 13:19381.

Jacobs M*, Stramel DM*, Shair M, Agrawal SK. Evaluating Gait Stability and Muscle Activation in Different Hand Holding Conditions Using the Robotic Walker-mTPAD. Sensors 2023; 23(13):5996. *First Author

Stramel DM, Winterbottom L, Stein J, Agrawal SK. Overground Robotic Gait Trainer mTPAD Improves Gait Symmetry and Weight Bearing in Stroke Survivors. Bioengineering 2023; 10(6):698.

Stramel DM. mTPAD A Novel, Overground Cable-Driven Robotic Gait Trainer. Doctoral dissertation, Columbia University 2023.

Stramel DM, Prado A, Roy SH, Kim H, Agrawal SK. Effects of timed frontal plane pelvic moments during overground walking with a mobile TPAD system. IEEE Transactions on Neural Systems and Rehabilitation Engineering 2022; 31:48-57.

Stramel DM, Agrawal SK. Assessing Changes in Human Gait with a Mobile Tethered Pelvic Assist Device (mTPAD) in Transparent Mode with Hand Holding Conditions. 9th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob) 2022; 1-6.

Stramel DM, Agrawal SK. Validation of a forward kinematics based controller for a mobile tethered pelvic assist device to augment pelvic forces during walking. IEEE International Conference on Robotics and Automation (ICRA) 2020; 10133-10139.

Stramel DM, Carrera RM, Rahok SA, Stein J, Agrawal SK. Effects of a person-following light-touch device during overground walking with visual perturbations in a virtual reality environment. IEEE Robotics and Automation Letters 2019; 4(4):4139-46.

Deffenbaugh PI, Stramel DM, Church KH. Increasing the Reliability of 3D Printing a Wi-Fi Sensor Device. International Symposium on Microelectronics 2016; 000240-000244.

Presentations

Stramel DM. Assessing Changes in Human Gait with a Mobile Tethered Pelvic Assist Device (mTPAD) in Transparent Mode with Hand Holding Conditions. Poster presentation, 9th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob), Seoul, Korea, 2022.

Agrawal SK, Dutkowsky J, Damiano D, Gordon A, Galloway C, Gaebler-Spira D, Roye D, Kim H, Murray

R, Stramel D. Robotic Rehabilitation: Evidence-based Training of Balance, Posture, Mobility and Gait. Seminar, 74th Annual American Academy for Cerebral Palsy and Developmental Medicine (AACPDM) Conference, Virtual, 2020

Stramel DM. Validation of a Forward Kinematics Based Controller for a mobile Tethered Pelvic Assist Device to Augment Pelvic Forces during Walking. Presentation, 2020 IEEE International Conference on Robotics and Automation (ICRA), Virtual, 2020.

Stramel DM. Design, Control, and Validation of a mobile Tethered Pelvic Assist Device (TPAD). Presentation, Columbia University Summer Robotics Seminar Series, Virtual, 2020.

Stramel DM. Effects of a Person-Following Light-Touch Device During Overground Walking With Visual Perturbations in a Virtual Reality Environment. Presentation, 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Macau, China, 2019.