Exponent®
Engineering & Scientific Consulting

Madeline Griffith

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Professional Profile

Ms. Griffith has expertise in the areas of accident reconstruction and automotive injury biomechanics. Leveraging her educational and professional backgrounds in mechanical engineering and in automotive safety research, she addresses issues related to motor vehicle collisions and accident reconstruction. Her skills include analysis of vehicle and occupant dynamics, Computer Aided Design (CAD), imaging vehicle event data recorders, laser scanning for accident reconstruction, and a variety of accident reconstruction analysis methodologies.

Prior to joining Exponent, Ms. Griffith worked as a Research Project Engineer at the Center for Injury Research and Prevention (CIRP) at the Children's Hospital of Philadelphia (CHOP). While at CIRP, she provided engineering support for research projects across a range of topics including automotive safety biomechanics, pediatric occupant safety, teenage driving, and neuromotor control and development. She managed human subject research studies to analyze the effects of non-standard seating positions and postures, advanced restraint systems, and Advanced Driver Assistance Systems (ADAS) on the kinematics and kinetics of pediatric, adolescent, and adult drivers and occupants in sled-simulated low-speed scenarios. She has extensive experience using MATLAB to analyze human subject data collected using motion capture systems, electromyography (EMG), load cells, and inertial measurement units (IMUs). Her experience also includes both low- and high-speed sled testing with anthropomorphic test devices (ATDs), analysis of vehicle test data, and the design, modification, and maintenance of human subject test fixtures and data acquisition systems.

Academic Credentials & Professional Honors

M.S.E., Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 2020

B.S., Mechanical Engineering, University of Notre Dame, 2018

Outstanding Research Award, School of Engineering and Applied Science, University of Pennsylvania, 2020

Tau Beta Pi Honor Society

Pi Tau Sigma Honor Society

Prior Experience

Research Project Engineer, Center for Injury Research and Prevention, Children's Hospital of Philadelphia, 2020-2023

Publications

Griffith M, Akkem R, Maheshwari J, Seacrist T, Arbogast KB, Graci V. 2023. The effect of a startle-based warning, age, sex, and secondary task on takeover actions in critical autonomous driving scenarios. Frontiers in Bioengineering and Biotechnology, 11: 1147606.

Maheshwari J, Griffith M, Baker G, Patton D, Mansfield J. 2023. Effect of naturalistic seating postures and seatbelt routing on booster-seated Q6 ATD kinematics and kinetics in frontal impacts. Accident Analysis and Prevention, 189: 107140.

Graci V, Burns J, Griffith M, Seacrist T. 2023. The effect of reclined seatback angles on the motion of booster-seated children during lateral-oblique low-acceleration impacts. Accident Analysis and Prevention, 188: 107117.

Graci V, Griffith M, Seacrist T, Brase D, Mishra E, Pipkorn B, Lubbe N, Arbogast KB. 2022. Repositioning forward-leaning vehicle occupants with a pre-pretensioner belt and a startle-based warning in pre-crash scenarios. Traffic Injury Prevention, 23sup1, S32-S37.

Graci V, Maltenfort M, Schneider M, Griffith M, Seacrist T, Arbogast KB. 2021. Quantitative characterization of AEB pulses across the modern fleet. Traffic Injury Prevention, 22sup1, S62-67.

Seacrist T, Maheshwari J, Graci V, Holt C, Akkem R, Chingas G, Douglas E, Griffith M, Palumbo A. 2019. Biofidelic evaluation of the large omni-directional child anthropomorphic test device in low speed loading conditions. Stapp Car Crash Journal, pp. 213-234.

Presentations

Griffith M, Seacrist T, Graci V. Can vehicle seat loads discriminate between occupants' displacements in non-standard postures during low-acceleration manoeuvres? 2023 IRCOBI European Conference.

Griffith M, Seacrist T, Jordan A, Sherony R, Hallman J, Arbogast KB, Graci V. 2020. A novel methodology to examine occupant motion during the AEB pulses present in the modern fleet. 28th NHTSA International Workshop of Human Subjects for Biomechanical Research.

Additional Education & Training

"2025 HVE Forum," Engineering Dynamic Corporation, 2025

"Crash Data Retrieval Tool Data Analyst Course," Collision Safety Institute, 2024

"Advanced Applications of Heavy Vehicle EDR Data," SAE International, 2024

"Accessing and Interpreting Heavy Vehicle Event Data Recorders," SAE International, 2024

"Bosch Crash Data Retrieval Tool Technician Training," Institute of Police Technology and Management, 2023