DESIGN RESEARCH ENGINEERING
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Kathleen Rodowicz, Ph.D., P.E.
Principal Engineer

Professional Specialization

- Biomechanical investigation, reconstruction, and performance analysis of passenger, heavy trucking, industrial, and off-road vehicles
- Analysis of human kinematics, injury potential, and injury mechanisms in vehicle crashes, industrial accidents, sporting incidents, slip-and-fall events, and escalator and elevator incidents
- Design, implementation, and execution of vehicle and vehicle component testing
- Analysis of real-world accident and injury data
- Human surrogate testing and analysis

Education and Licensing

Bachelor of Science - Mechanical Engineering, Drexel University, 2004
Doctor of Philosophy - Mechanical Engineering, Drexel University, 2008
Registered Professional Engineer, Maryland #45503
Certified Lift Truck Operator

Professional Experience

Design Research Engineering, Principal Engineer, September 2025 - Present
Carr Engineering, Inc., Principal Engineer, July 2024 - August 2025
Exponent, Inc., 2008 - 2024

Principal Engineer & Practice Director, July 2021 - June 2024
Principal Engineer, April 2018 - July 2021
Managing Engineer/Senior Managing Engineer, April 2013 - April 2018
Associate/Senior Associate, September 2008 - April 2013

Professional Affiliations

Society of Automotive Engineers
American Society of Mechanical Engineers

Research Activities

- Influence of restraint use and restraint technologies on occupant kinematics, injury potential, and injury mechanisms in vehicle crashes
- Effect of disease on spine biomechanics and injury tolerance
- Injury risk and injury mitigation in industrial settings
- Balance retention and postural control strategies following a postural disturbance
- Effectiveness of headgear in preventing injury in various environments

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Select Publications

Rapp van Roden et al. (2025). *"Influence of Spinal Bridging Ossification on Mechanical Properties and Fracture Tolerance Under Flexion/Extension Loading."* Annals of Biomedical Engineering; doi.org/10.1007/s10439-025-03790-3.

Rapp van Roden et al. (2022). *"Factors Influencing the Effectiveness of a Center-Mounted Airbag in Reducing Occupant Excursion and Injury Potential in High-Speed Lateral Impacts."* SAE Paper No. 2022-01-0843.

Rodowicz et al. (2021). *"Evaluation of the Effect of a Rear Operator Guard on the Overall Safety for Operators of Stand-Up Lift Trucks."* ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering.

Richards et al. (2016). *"Ice Hockey Shoulder Pad Design and the Effect on Head Response during Shoulder-To-Head Impacts."* Sports Biomechanics; 15(4):385-396.

Rodowicz et al. (2014). *"Head Injury Potential and the Effectiveness of Headgear in Women's Lacrosse."* Annals of Biomedical Engineering; 43(4):949-957.

Yang et al. (2014). *"Baseball Head Impacts to the Non-Helmeted and Helmeted Hybrid III ATD."* ASME International Mechanical Engineering Congress and Exposition, IMECE2014-38648.

Rodowicz & Watson (2014). *"Incidence Rate of Sport-Related Traumatic Brain Injury Diagnoses in the General Population: An Analysis of Emergency Department Visits in 2001 and 2010."* ASTM Selected Technical Paper; 1552:187-195.

Fittanto & Rodowicz (2012). *"A Comparison of 3D Model Dynamic Simulation Results with Low-Speed Crash Test Data."* SAE Paper No. 2012-01-0601.

Rodowicz et al. (2011). *"Passenger Vehicle Occupant Response to Low-Speed Impacts with a Tractor-Semitrailer."* SAE Paper No. 2011-01-1125.

Rodowicz et al. (2010). *"Biomechanical, Perceptual, and Cognitive Factors Involved in Maintaining Postural Control While Standing or Walking on Non-Moving and Moving Surfaces: A Literature Review."* ASME International Mechanical Engineering Congress and Exposition, IMECE2010-39276.

Muhammad et al. (2010). *"Biomechanical, Perceptual, and Cognitive Factors Involved in Balance Recovery Following Unexpected Perturbations: A Literature Review."* ASME International Mechanical Engineering Congress and Exposition, IMECE2010-39285.