

Janine E. Smedley
Manager

Professional Profile

Ms. Janine Smedley (Pierce) is a Manager in Exponent's Biomechanics practice and is based in the Test and Engineering Center in Phoenix, Arizona. Ms. Smedley's expertise is in injury biomechanics, with an emphasis on occupant kinematics and human injury tolerance. She has conducted a variety of experimental tests for the purpose of investigating occupant kinematics, occupant containment, and injury potential in planar and rollover automobile collisions, including full-scale sled and crash tests using anthropomorphic test devices (ATDs), static and dynamic rollover testing, and evaluations of the performance of laminated glass. Ms. Smedley has additional research experience in musculoskeletal modeling and cadaveric testing for the analysis of joint and muscular loads.

Prior to joining Exponent, Ms. Smedley was a National Science Foundation Graduate Research Fellow in the Orthopaedic Biomechanics Lab at Massachusetts General Hospital working in conjunction with Harvard Medical School faculty. In that capacity, she worked to develop more accurate methods for estimating muscle forces in-vivo. Her research experience includes robotic testing of cadaveric forearms, computer modeling of forearm kinematics, acquisition and analysis of electromyographic signals, and analysis of the effects of various orthopaedic procedures on joint kinematics. Ms. Smedley's background also includes exposure to various issues surrounding spaceflight, including time spent working for NASA and The Boeing Company, and the completion of courses focusing on space suit design and the multifaceted response of the human body to microgravity conditions.

Academic Credentials and Professional Honors

M.S., Mechanical Engineering, Biomechanics Emphasis, Massachusetts Institute of Technology, 2004

B.S., Mechanical Engineering, University of California, Berkeley (*honors*), 2002

National Science Foundation Graduate Research Fellow; Pi Tau Sigma (National Honorary Mechanical Engineering Society)

Additional Education

Traffic Accident Reconstruction, Northwestern University Center for Public Safety, Phoenix, AZ, September 2008.

Occupant and Vehicle Kinematics in Rollovers, Society of Automotive Engineers, Detroit, MI, April 2007.

Injuries, Anatomy, Biomechanics & Federal Regulation, Society of Automotive Engineers, Troy, MI, September 2005.

Publications

Rodowicz KA, Dupont K, Smedley J, Raasch C, Mkandawire C, Fittanto D, Bare C, Smith J. Passenger vehicle occupant response to low-speed impacts with a tractor-semitrailer. SAE 2011 World Congress Paper No. 2011-01-1125, Society of Automotive Engineers, Warrendale, PA, 2011.

Heller MF, Newberry WN, Smedley JE, Eswaran SK, Croteau JJ, Carhart MR. Occupant kinematics and injury mechanisms during rollover in a high strength-to-weight ratio vehicle. SAE 2010 World Congress Paper No. 2010-01-0516 and SAE International Journal of Passenger Cars – Mechanical Systems August 2010 3:450-466, Society of Automotive Engineers, Warrendale, PA, 2010.

Funk JR, Beauchamp G, Rose N, Fenton S, Pierce J. Occupant ejection trajectories in rollover crashes: Full-scale testing and real world cases. SAE 2008 World Congress Paper No. 2008-01-0166 and SAE International Journal of Passenger Cars – Mechanical Systems 1(1):43-54, Society of Automotive Engineers, Warrendale, PA, 2008.

Pierce J, Carhart M, Bare C, Blakeslee A, Heald J. Retention characteristics of production laminated side windows. SAE 2007 World Congress Paper No. 2007-01-0376 and SAE 2007 Transactions Journal of Passenger Cars – Mechanical Systems 6(116):193-202, Society of Automotive Engineers, Warrendale, PA, 2007.

Richards D, Carhart M, Raasch C, Pierce J, Steffey D, Ostarello A. Incidence for thoracic and lumbar spine injuries for restrained occupants in frontal collisions. 50th Annual Proceedings of the Association for the Advancement of Automotive Medicine, Chicago, IL, October 16–18, 2006.

Larson R, Raasch C, Pierce J. Measurement and evaluation of vibration exposure for locomotive crew members. The 1st American Conference on Human Vibration, Morgantown, WV, June 5–7, 2006.

Vijayakumar V, Scher I, Gloeckner DC, Pierce J, Bove R, Young D, Cargill R. Head kinematics and upper neck loading during simulated low-speed rear-end collisions: A comparison with vigorous activities of daily living. SAE Paper No. 2006-01-0247, SAE 2006 World Congress, Society of Automotive Engineers, Warrendale, PA, 2006.

Fisher JL, Newberry WN, Krishnan R, Pierce J, Moore TLA. Late-phase occupant rebound after rear-end impact. Proceedings, ASME Summer Bioengineering Conference, Abstract 188080, Vail, CO, June 22–26, 2005.

Yamaguchi G, Carhart M, Larson R, Richards D, Pierce J, Raasch C, Scher I, Corrigan CF. Electromyographic activity and posturing of the human neck during rollover tests. SAE 2005 World Congress Paper No. 2005-01-0302 and Transactions Journal of Passenger Cars, Society of Automotive Engineers, Warrendale, PA, 2005.

Pierce JE, Li G. Muscle forces predicted using optimization methods are coordinate system dependent. *Journal of Biomechanics* 2005; 38:695–702.

Presentations

Smedley J. Glazing and the rollover environment. SAE 2010 World Congress, Detroit, MI, April 15, 2010.

Smedley J. Glazing loading and performance in rollover. Southwestern Association of Technical Accident Investigators (SATAI), Laughlin, NV, March 5, 2010.

Smedley J. Biomechanics and the seatbelt defense. National Association of Legal Investigators (NALI) Conference, Phoenix, Arizona, February 6, 2010.

Smedley J. Biomechanics and the seatbelt defense. Arizona Association of Defense Counsel (AADC) Luncheon, December 10, 2009.

Smedley J. Pre- and post- O'Hara: Evolution of the glazing defect theory. Bowman and Brooke Hot Topics Product Litigation Seminar, Troy, MI, September 18, 2008.

Pierce J. Retention characteristics of production laminated side windows. SAE 2007 World Congress, Detroit, MI, April 16, 2007.

Pierce J. Incidence for thoracic and lumbar spine injuries for restrained occupants in frontal collisions. 50th Annual Conference of the Association for the Advancement of Automotive Medicine, Chicago, IL, October 16, 2006.

Pierce J. The effects of indeterminate constraint conditions in inverse dynamic optimization methods on predicted muscle loads. 12th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, University of California, San Francisco, CA, March 6, 2004.

Professional Affiliations

- Society of Automotive Engineers—SAE
- Society of Women Engineers—SWE
- American Society of Mechanical Engineers—ASME
- Southwestern Association of Technical Accident Investigators—SATAI