

Exponent®
Engineering & Scientific Consulting

Catherine Corrigan, Ph.D.

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Professional Profile

Dr. Catherine Corrigan is the Chief Executive Officer of Exponent. Dr. Corrigan joined the Company in 1996, was promoted to Principal in the Biomechanics Practice in 2002, and to Corporate Vice President in 2005.

In 2012, Dr. Corrigan was appointed Vice President of Exponent's Transportation Group, overseeing the company's Vehicle Engineering, Biomechanics, Human Factors, and Statistical and Data Sciences practices, as well as Visual Communications. She was appointed President of the Company in 2016 and Chief Executive Officer in 2018.

Dr. Corrigan has consulted in the area of injury biomechanics and on issues related to motor vehicle and product safety for more than twenty years. Dr. Corrigan holds a Ph.D. in Medical Engineering from the Harvard-MIT Division of Health Sciences and Technology, an M.S. in Mechanical Engineering from MIT, and a BS.E. in Bioengineering from the University of Pennsylvania.

Dr. Corrigan addresses issues involving the biomechanics of human injury, with expertise in the areas of human tolerance and occupant kinematics. Her work includes analysis of traumatic injuries associated with transportation, heavy equipment, falls, consumer products, and the workplace. Her research activities have included studies of occupant kinematics and injuries in the automotive environment, bone and joint mechanics, pediatric biomechanics, and the mechanics of central nervous system injury. Dr. Corrigan’s experience also includes computerized accident simulation and field accident data analysis.

Dr. Corrigan has held appointments as Adjunct Professor in the Department of Mechanical Engineering at Temple University, and as Visiting Lecturer in the Department of Mechanical and Aerospace Engineering at Princeton University. Prior to joining Exponent, Dr. Corrigan was a researcher at the Orthopedic Biomechanics Laboratory of Beth Israel Hospital and Harvard Medical School.

Academic Credentials & Professional Honors

Ph.D., Medical Engineering and Medical Physics, Massachusetts Institute of Technology (MIT), 1996

M.S., Mechanical Engineering, Massachusetts Institute of Technology (MIT), 1992

B.S., Bioengineering, University of Pennsylvania, 1990

National Academy of Engineering (elected 2021)

Tau Beta Pi

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Sigma Xi

Tau Beta Pi Sophomore of the Year Award

American Association of University Women Engineering Dissertation Fellow

Irwin S. Chanin Fellow in Medical Engineering & Medical Physics

Rhone-Poulenc Rorer Research Fellow in Health Sciences & Technology

National Science Foundation Graduate Fellow

Herman P. Schwan Award for Academic Achievement in Bioengineering, University of Pennsylvania

Publications

Courtney A, Corrigan C, Steffey D. Letter to the Editor regarding Bajaj D, et al., The resistance of cortical bone tissue to failure under cyclic loading is reduced with alendronate. Bone 2014; 64:57-64. Bone, DOI 10.1016/j.bone.2015.03.008.

Heller MF, Imler SM, Zhao K, Watson HN, Corrigan CF. The effect of frontal collision delta-V and restraint status on injury outcome. 2010 Society of Automotive Engineers (SAE) World Congress, SAE 2010-01-0145.

Imler SM, Heller MF, Zhao K, Watson HN, Corrigan CF. The effect of side impact collision delta-V, restraint status, and occupant position on injury outcome. 2010 Society of Automotive Engineers (SAE) World Congress, SAE 2010-01-1158.

McGowan JC, Lucas SR, Corrigan CF, Burnett RA, Levitt AE. Seatback strength and occupant response in rear impact crash: Observations with respect to large occupant size and position. 2010 Society of Automotive Engineers (SAE) World Congress, SAE 2010-01-1029.

Moore T, Prange M, Corrigan CF. Inertially-induced cervical spine injuries in the pediatric population. SAE World Congress, SAE 2009-01-0395, Detroit, MI, April 20 23, 2009.

Moore T, Ray R, Raasch C, Huang S, Corrigan CF. Police accident report restraint usage accuracy and injury severity. SAE World Congress, SAE 2009-01-12533, Detroit, MI, April 20 23, 2009.

Prange M, Newberry W, Peterson D, Smyth B, Moore T, Corrigan C. Inertial neck injuries in children involved in frontal collisions. SAE World Congress, Society of Automotive Engineers, 2007-01-1170, Warrendale, PA, 2007.

Ashby B, Lai W, Carhart M, Newberry W, Weaver B, Corrigan C. Compressive neck preloading during the airborne phase of vehicle rollover. SAE World Congress, Society of Automotive Engineers, 2007-01-0377, 2007, Warrendale, PA, 2007.

Gloeckner DC, Bove R, Croteau J, Corrigan C, Moore T. Timing of head-to-vehicle perimeter contacts in rollovers. SAE World Congress, SAE 2007-01-0370, Detroit, MI, April 16-19, 2007.

Yamaguchi G, Ashby B, Luepke P, Bove R, Moore T, Corrigan C. Theoretical analysis of a method of computing dynamic roof crush during rollovers. Transactions of the Society of Automotive Engineers, SAE 2007-01-0366, 2007.

Gloeckner DC, Moore TLA, Steffey D, Le-Resnick H, Bare C, Corrigan C. Implications of vehicle roll direction on occupant ejection and injury risk. Association for the Advancement of Automotive Medicine,

50th Annual Scientific Conference, Chicago, IL, October 15-18.

Yamaguchi GT, Ashby B, Lai W, Carhart MR, Richards D, Corrigan C. Occupant mechanics in rollover simulations of high and low aspect ratio vehicles. SAE 2006 World Congress, Detroit, MI, 2006. Excellence in Oral Presentation award.

Moore T, Vijayakumar V, Steffey DL, Ramachandran K, Corrigan C. Biomechanical factors and injury risk in high-severity rollover. 49th Annual Proceedings of the Association for the Advancement of Automotive Medicine, pp. 133-150, 2005.

Mkandawire C, Nicosia MA, Moore TLA, Corrigan C. Postural stability of stand-up forklift operators in response to normal braking procedures. 2005 ASME International Mechanical Engineering Congress and Exposition, Orlando, FL, November 5-11, 2005.

Newberry W, Carhart M, Lai W, Corrigan C, Croteau J, Cooper E. A computational analysis of the airborne phase of vehicle rollover: Occupant head excursion and head-neck posture. Society of Automotive Engineers Paper #2005-01-0943, SAE World Congress, Detroit, MI, 2005.

Lai W, Ewers B, Richards D, Carhart M, Newberry W, Corrigan C. Evaluation of human surrogate models for rollover. Society of Automotive Engineers Paper #2005-01-0941, SAE World Congress, Detroit, MI, 2005.

Yamaguchi G, Carhart M, Larson R, Richards D, Pierce J, Raasch C, Scher I, Corrigan C. Electromyographic activity and posturing of the human neck during rollover tests. Society of Automotive Engineers Paper #2005-01-0302, SAE World Congress, Detroit, MI, 2005.

Yamaguchi G, Richards D, Larson R, Carhart M, Cargill R, Lai W, Corrigan C. Development of a computational method to predict occupant motions and neck loads during rollovers. Society of Automotive Engineers Paper #2005-01-0300, SAE World Congress, Detroit, MI, 2005.

Ford CM, Villarraga ML. Applications of bone mechanics. In: Bone Mechanics Handbook. Cowin SC (ed), CRC Press, Inc., Boca Raton, FL, 2001.

Barbee KA, Blackman BR, Ford CM, Thibault LE. Neural cell injury: Characterization and treatment strategy. Prevention of Injury through Biomechanics Symposium, Detroit, MI, 1998.

Ford CM, Gibson LJ. Uniaxial strength asymmetry in cellular materials: An analytical model. International Journal of Mechanical Sciences 1998; 40:521-531, 1998.

Ford CM, Keaveny TM. The dependence of shear failure properties of trabecular bone on apparent density and trabecular orientation. Journal of Biomechanics 1996; 29:1309-1317.

Ford CM, Keaveny TM, Hayes WC. The effect of impact direction on the structural capacity of the proximal femur during falls. Journal of Bone and Mineral Research 1996; 11:377-383.

Ford CM. Failure of the human proximal femur: Material and structural perspectives. Ph.D. Thesis, Massachusetts Institute of Technology, 1996.

Keaveny TM, Wachtel EF, Ford CM, Hayes WC. Differences between the tensile and compressive strengths of bovine tibial trabecular bone depend on modulus. Journal of Biomechanics 1994; 27:1137-1146.

Ford CM. The role of the meniscus in knee joint load transmission: A three-dimensional finite element study. Master's Thesis, Massachusetts Institute of Technology, 1992.

Ford CM. Determination of the patellofemoral joint reaction force using electromyography. Senior Thesis,

University of Pennsylvania, 1990.

Presentations and Published Abstracts

Richards D, Scher I, Vijayakumar V, Carhart M, Larson R, Taylor S, Corrigan C. Repetitive head loading: Accelerations during cyclic, everyday activities. Conference of the International Society of Biomechanics, Cleveland, OH, August 2005.

Scher I, Richards D, Vijayakumar V, Carhart M, Corrigan C, Jaekel D. Coronal head accelerations during vigorous activities of daily living. ASME Summer Bioengineering Conference, Vail, CO, June 22-26, 2005.

Corrigan C, Cripton P, Croteau J. The influence of vehicle roll rate on neck loading during controlled vehicle-to-ground impacts. World Congress of Biomechanics, Calgary, Alberta, August 2002.

Ford CM. Biomechanics in accident investigation. Presented to the American Society of Safety Engineers, Washington, DC, May 1998.

Ford CM. Human tolerance to impact and accident investigation. Harvard University - Massachusetts Institute of Technology Division of Health Sciences and Technology Seminar, Cambridge, MA, December 1998.

Ford CM, Keaveny TM. Failure properties of trabecular bone under torsional loading. Transactions of the 41st Annual Meeting of the Orthopaedic Research Society 1995; 20:531.