The Biodynamics Laboratory was established in 1982 by Professor William S. Marras, one of the leading researchers in the world in the area of biomechanical modeling of the spine. His research focuses on biomechanics in spine disorder causation and its role in the prevention, evaluation, and treatment of spine disorders. Complementary research is conducted in the Orthopaedic Ergonomics Laboratory, directed by Professor Steven Lavender, and the Engineering Laboratory for Human Factors, Ergonomics, & Safety, directed by Professor Carolyn Sommerich.

**Basic Research:** In terms of basic research, the focus has been on understanding and modeling associations between cumulative trauma developing in the spine and upper extremity with risk factor exposure that occurs in occupational settings. Research in the Biodynamics Laboratory was some of the first to identify strong associations between spine movement variables (range of movement, speed of movement, and acceleration) and lost time back injuries. The Biodynamics Laboratory is now an integral part of the Spine Research Institute, with a mission to systematically improve the way spine disorders are prevented, evaluated, and treated, which is done through the identification of disorder causal pathways. As for basic research concerning the upper extremity, Prof. Sommerich and Lavender developed a model of carpal tunnel syndrome that definitively demonstrated an association between moderately forceful repetitive hand use and the development of median mononeuropathy.