

Robert Giachetti, Ph.D.
Associate

Professional Profile

Dr. Giachetti is an Associate in Exponent's Mechanical Engineering and Materials / Metallurgy practice. Dr. Giachetti has experience in biomechanics and mechanical system design. He has used biomechanics to investigate human muscular coordination in the lower limbs with a specific emphasis on balance and posture. He has also utilized and developed biomechanical and analytical tools to investigate occupant induced whole body vibrations in the transportation industry.

Prior to joining Exponent, Dr. Giachetti worked in the Biomechanics laboratory at the University of Wisconsin – Madison, where he focused his academic training, research, and, teaching in pursuit of characterizing how humans exert force on their environment using their lower limbs. At the Biomechanics Research Laboratory at the University of Illinois at Chicago, he assisted in the analysis and validation of a total knee replacement through the use of finite element modeling and analysis in ANSYS to determine contact stresses within the artificial joint.

Dr. Giachetti's academic emphasis extended beyond Biomechanics and involved intensive study in Mechanical Engineering curricula, including advanced courses in linear and nonlinear dynamics, stress analysis and continuum mechanics, and vibrations. Dr. Giachetti also has work experience in the field of mechanical design, working on projects such as: the validation of the ultrasonic welding manufacturing process of assay trays, the design of steel coiling machinery, and the general design of custom lifting equipment.

Dr. Giachetti has extensive experience designing and programming data analysis and acquisition software in LabVIEW. His experience in programming not only includes real time analysis software, but also, the implementation of multiple, simultaneous acquisition sources. These acquisition systems have included cameras, accelerometers, serial devices, force plates, force transducers, and GPS devices. His programming expertise also extends to customized 2-D motion capture solutions and the implementation of the IMAQ and Vibration packages available for LabVIEW.

Academic Credentials and Professional Honors

Ph.D., Mechanical Engineering, University of Wisconsin, Madison 2008

M.S., Mechanical Engineering, University of Illinois at Chicago, 2000

B.S., Mechanical Engineering, Marquette University, 1997

Publications

Giachetti R, Weaver B, Trimble J. Real-time monitoring and analysis of whole body vibration in locomotive engineers. 4th International Conference on Whole-Body Vibration Injuries, 2009.

Gruben KG, Giachetti RS, Lazarus JA. Directional control of foot force in Parkinson disease. The Movement Disorder Society's 12th International Congress of Parkinson's Disease and Movement Disorders, 2008.

Gruben KG, Giachetti RS, Schmidt MW. Control of force direction depends on center of pressure not limb posture. Society for Neuroscience 36th Annual Meeting, 2006.

Giachetti RS, Gruben KG. Foot force direction and center of pressure. Progress in Motor Control V, State College, PA, 2005.

Gruben KG, Hasman CL, Schmidt MW, Giachetti RS, Tan L. Altered directional control of foot force is a primary effect of stroke. Progress in Motor Control V, State College, PA, 2005.

Gruben KG, Lopez-Ortiz C, Giachetti RS. Muscular and postural components of foot force during quasi-static extension efforts. JAB 19(3), 2003.

Gonzalez M, Giachetti R, Aram L, Amirouche F. Validation of a finite element contact model for the use in total knee arthroplasty. Orthopaedic Research Society 47th Annual Meeting, 2001.

Amirouche FM, Giachetti RS, Aram L, Gonzalez M. Induced stress in TKA resulting from malrotation. Summer Bioengineering Conference, 2001.

Aram L, Amirouche FM, Gonzalez M, Giachetti RS. Characterization of contact pressure in total knee arthroplasty as a function of component position and ligament balance. XVIIIth Congress of the ISB, 2001.

Amirouche FM, Giachetti RS, Aram L, Gonzalez M. Validation of a finite element contact model for the use in total knee arthroplasty. XVIIIth Congress of the ISB, 2001.

Amirouche FM, Aram L, Gonzalez M, Giachetti RS, Mahr C. the fitting of the human joint through micro-implanted sensors. Proceedings, 1st Annual International IEEE-EMBS Special Topic Conference on Microtechnologies in Medicine & Biology, 2000.

Amirouche FM, Gonzalez M, Aram L, Giachetti RS, Mahr C. A contact pressure based prosthetic fitting device for a Total Knee Arthroplasty (TKA). Proceedings, Engineering of Sport 3rd International Conference and Exhibition, 2000.

Giachetti R, Amirouche F, Aram L, Gonzalez M. Biomechanical problems with contact pressure distribution in the knee joint after total knee arthroplasty. Proceedings, ASME Winter Conference, 2000.

Prior Experience (Engineering)

Intern, BioTechPlex, 2001

Project Engineer, Braner USA, 1998–1999

Estimator and Engineer, Alloy Sling Chain Industries LTD., 1998

Teaching Experience

University of Wisconsin-Madison, departments of Mechanical Engineering and Kinesiology

Lecturer, Introduction to Dynamic Systems (vibrations)

Teaching Assistant, Introduction to Biomechanics

Teaching Assistant, Introduction to Dynamic Systems

University of Illinois at Chicago, department of Mechanical Engineering

Teaching Assistant, Engineering Economy

Marquette University, Department of Physics:

Teaching Assistant, General Physics