



Exponent[®]
Engineering & Scientific Consulting

Jonathan Gosyne, Ph.D.

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Professional Profile

Dr. Gosyne's primary area of expertise is muscle- and joint-level biomechanics, with a focus on understanding the behavior of biomechanical systems when influenced by external stimuli, such as unsteady terrain or wearable devices. Dr. Gosyne's research experience includes bio-inspired product design and testing, human volunteer testing, and the design and simulation of large-scale computational models. He has both led and contributed to multiple research efforts at the intersection of biomechanics, engineering, and sport science, which focus on studying the interaction of body's mechanics, dynamics, and energetic properties during locomotor movement over difficult terrain; many of these have been published in peer-reviewed journals and presented at various professional conferences over his career.

At Exponent, in addition to experience in assessing injuries involving motor vehicles, Dr. Gosyne specializes in the analysis of a variety of gait and locomotion related injuries including pedestrian incidents, occupational accidents, slip-and-fall accidents, and injuries involving recreational activities and equipment. Prior to joining Exponent, Dr. Gosyne was a Graduate Student Instructor and Researcher at the Georgia Institute of Technology. His classroom experiences focused on technical communication and the practical application of engineering theory outside of the traditional classroom setting, working primarily with undergraduate students. His research investigated the relationship between whole-body energetics, joint dynamics, and muscular mechanics, with the purpose of understanding inefficiencies in human gait when faced with unstructured terrain. Similarly, and in parallel, he also focused on iterative, bioinspired design of augmentative wearable devices to combat many of the efficiencies identified in his muscle-level work. Outside of this, Dr. Gosyne founded CCM Inc., a medical nonprofit that aims to connect US-based medical providers with underserved international communities, and he has served as a medical logistics liaison for the Anglo-American Caribbean.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Georgia Institute of Technology, 2022

M.S., Mechanical Engineering, Georgia Institute of Technology, 2018

B.S., Mechanical Engineering, Georgia Institute of Technology, 2017

Graduate Certificate, Biorobotics, Georgia Institute of Technology, 2021

National Science Foundation (NSF) Accessibility, Movement and Rehabilitation Science (ARMS) Scholar, Georgia Institute of Technology, 2020

Tau Beta Pi Engineering Honor Society

Pi Tau Sigma Mechanical Engineering Honor Society

Academic Appointments

Affiliate Researcher- Wearable Robotics, Woodruff School of Mechanical Engineering, Georgia Institute of Technology, 2023

Prior Experience

Graduate Student Instructor, Georgia Institute of Technology, 2021-2022

Graduate Teaching Assistant, Georgia Institute of Technology, 2019-2020

Graduate Research Assistant, Georgia Institute of Technology, 2018

Medical Logistics Coordinator, CCM Inc, 2013-2022

Design Consultant, Artifex Advanced Technologies, 2019-2022

Professional Affiliations

The American Society of Biomechanics (ASB)

The American society of Mechanical Engineers (ASME)

Publications

Beck ON, Gosyne J, Franz JR, Sawicki GS. Cyclically Producing the Same Average Muscle-Tendon Force with a Smaller Duty Increases Metabolic Rate. Proceedings of the Royal Society B. 2020 Aug 26;287(1933):20200431.

Lou Q, Khan MM, Bick M, Soens PO, Gosyne JR, Sawicki GS. The Basilisk Boot Project: Development of a Foot-Ankle Exoskeleton to Navigate Dissipative Terrains. Dynamic Walking 2020, Pensacola, FL, 2020

Gosyne JR. Bipedal Robotic Walking on Granular Material: An Inertial and Kinematic Control Approach (Thesis, Georgia Institute of Technology). 2018

Gosyne JR, Hubicki CM, Xiong X, Ames AD, Goldman DI. Bipedal Locomotion Up Sandy Slopes: Systematic Experiments Using Zero Moment Point Methods. In 2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids) 2018 Nov 6 (pp. 994-1001). IEEE.

Presentations

Gosyne, JR, Sawicki, GS. Why is the Metabolic Cost of Locomotion Higher on Sand? Podium Presentation. North American Congress on Biomechanics (NACOB) 2022, Ottawa, ON, 2022

Gosyne, JR, Sawicki, GS. Going Off Road - Moving in Sand, Snow, Mud. Podium Presentation. University of Queensland Three Minute Thesis Competition (3MT) 2022, Atlanta, GA, 2022

Gosyne, JR, Sawicki GS. Optimizing Contact Area and Joint Stiffness of a Passive Foot-Ankle Exoskeleton for Locomotion on Deformable Terrain. Podium Presentation. The March Meeting of the American Physical Society (APS) 2021, Virtual, 2021

Gosyne, JR, Lou, Q, Sawicki, GS. The Effect of Frequency on the Energetics of Hopping in Dissipative

Terrain. Poster Presentation. The American Society of Biomechanics (ASB) Annual Meeting 2020, Atlanta, GA, 2020

Gosyne, JR, Goldman, DI, Sawicki GS. Optimizing Contact Area and Joint Stiffness of a Passive Foot-Ankle Exoskeleton for Hopping on Deformable Terrain. Podium Presentation, The Joint Meeting of the International Society of Biomechanics and the American Society of Biomechanics (ISB/ASB) 2019, Calgary, AB, 2019

Gosyne, JR, Goldman DI. The Manipulation of Granular Media Flow Properties to Produce Stable, Uphill, Low Mass Bipedal Locomotion. Poster Presentation. The March Meeting of the American Physical Society (APS) 2019, Boston, MA, 2019

Project Experience

Designer – Arctic Coke, The Coca-Cola Company, 2017

Research Grants

Gosyne, JR, Sawicki, GS, Goldman DI. Merging Terradynamics and Musculotendon Neuromechanics: Toward Wearable Robots for Augmented Human Locomotion on Non-Uniform Surfaces. The Institute for Robotics and Intelligent Machines Seed Grant for Cross Disciplinary Research, Atlanta, GA, 2018

Peer Reviews

Bioinspiration and Biomimetics

Engineering Research Express

International Conference on Advanced Robotics