Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Eschbach's areas of expertise include physiological monitoring and consumer technology centered around health, fitness and wellness.

He has more than two decades of experience working in human performance via physiological assessment and monitoring, development of biometric wearable devices as well as data collection and analysis to build and validate health, fitness and wellness technology and related uses cases in real-world settings. He has extensive experience developing innovative technology related to health outcomes, sensor outputs and algorithm development. His work has been instrumental in the development of wearable and hearable products, evaluation of human performance, standardization relative to wearable technologies and implementation of physiological and biomechanical metrics into technology and user experiences.

For the last 9 years Dr. Eschbach has worked as Chair or Vice-chair of the Consumer Technology Associations Health and Wellness Standards Committee where he has helped to develop standards for wearable technology and digital health.

Prior to joining Exponent, Dr. Eschbach was Director of the Biometrics Laboratory at Valencell Inc., where he managed research teams that created and executed experimental designs, data collection/analysis, and communication for relating biometrics, measured by technology, to physical performance, fitness, and health. During this time, he had considerable involvement with business to business as well as business to consumer relationships from early concept through prototyping and manufacturing of hearable and wearable devices. These devices and use cases brought product and services to market for physiological and biomechanical metrics and monitoring.

Additionally, Dr. Eschbach was Chair for the Department of Nutrition and Health and Human Performance as well as Director of The Human Performance Laboratory at Meredith College where he developed curriculum, implemented strategic planning initiatives as well as grew a well-known laboratory offering performance analysis for fitness and health.

Dr. Eschbach has experience with validation and verification of human metrics, under real-world conditions, related to technology, physiological metrics related to fitness, wellness and health such as heart rate, heart rate variability, stress, caloric expenditure, blood glucose monitoring, blood pressure, core temperature, carbohydrate and fat utilization, activity recognition, moderate to vigorous activities of daily living, cardiovascular fitness (VO2max), training zones (lactate thresholds) as well as experience with endurance sports, team sports, strength training, swimming and activities of daily living.

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His background in physiology, fitness and wellness monitoring, consumer electronics, health fitness and wellness standardization, and experience with consumer technology centered around heath fitness and wellness ideally positions him as a leader in the industry.

Academic Credentials & Professional Honors

Ph.D., Human Performance, University of Southern Mississippi, 2001

M.S., Exercise Science, University of Southern Mississippi, 1998

B.S., Zoology, Western Illinois University, 1996

Prior Experience

Director, Biometrics Laboratory, Valencell, Inc., 2012-2022

Director, Human Performance Laboratory, LLC, 2002-2022

Associate Professor, Division of Math and Science, North Carolina Wesleyan College, 2011-2012

Chair, Department of Nutrition, Health and Human Performance; Associate Professor, Meredith College, 2001-2011

Professional Affiliations

Health Fitness and Wellness Technology Standards Committee (R11), Consumer Technology Association, April 2015 – Present

Board member (founding member), Health Division, Consumer Electronics Association, April 2014 – 2022

Patents

US Patent 11,330,361: Hearing aid optical monitoring apparatus, May 10, 2022.

US Patent 11,058,304: Methods of controlling biometric parameters via musical audio, Jul 13, 2021.

US 10,856,812: Patent Methods and apparatus for detecting motion via optomechanics, Dec 8, 2020.

US Patent 10,623,849: Optical monitoring apparatus and methods, Apr 14, 2020.

US Patent 10,536,768: Optical physiological sensor modules with reduced signal noise. Jan 14, 2020.

US Patent 20170118551 A1: Earbud monitoring devices, Apr 27, 2017.

Publications

Sears T, Alvalos E, Lawson S, McAlister I, Eschbach C, Bunn J. Wrist-worn physical activity trackers progressively underestimate steps with increasing walking speeds. International Journal of Exercise Science. 2017; 10(5):764-773.

Bunn J, Manor J, Wells E, Catanzarito B, Kincer B, Eschbach C. Heart rate recovery and the role of cardiovascular fitness in recovery. Journal of Human Sport and Exercise. 2017; 12(2):349-357.

Bunn J, Eschbach C, Magal M, Wells E. The Effects of Warm-up Intensity and Duration on Cycling Time

Trial Performance. Central European Journal of Sport Science & Medicine. 2017; 17(1):5-13.

Presentations

Bunn J, Eschbach C. Considerations for qualitative and quantitative analysis of wearable technology. Southeast American College of Sports Medicine Regional Conference, Greenville, SC, February 2019.

Bunn J, Eschbach LC. Evaluating biometric wearables: From academics to industry. Tutorial. Southeast American College of Sports Medicine Regional Conference, Chattanooga, TN, February 2018.

Eschbach LC, LeBoeuf SF.. Systems approach to heart rate sensors. Applied Human Factors and Ergonomics International Conference, Orlando, FL, July 2018.

Magal, M., L.C. Eschbach, and R. Cain. ”Validity and Reliability of an Audio headset Earbud Sensor for Heart Rate Measurements” Accepted for presentation at the annual convention of the American College of Sports Medicine, San Francisco, CA, June 2012

Eschbach, L.C., Jennifer Bunn, Meir Magal, Michael Webster “Changes in Body Composition Prior to Competition in Bodybuilders and Figure Show Competitors” Presented at the annual convention of the American College of Sports Medicine, Denver, CO, June 2011

Eschbach, L.C., J.A. Bunn, K.A. Terracina, L. Mitchell, and S. Povich. “Hyperthermic effects on metabolism during treadmill running.” Presented at the annual convention of the Southeast Region of the American College of Sports Medicine, Greenville, SC, February 2011.