Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Adenekan is a research engineer with over seven years of experience in developing novel digital and wearable health technologies. She has extensive experience in physiological sensing, signal processing, data analysis and visualization (using MATLAB and Simulink, R, Python, etc.), user study design and implementation (in both healthy and clinical populations), and leading interdisciplinary collaborations between engineers and clinicians. She is proficient in making sense of the often-noisy datasets that result from collecting data on humans

During her doctoral program at Stanford, Dr. Adenekan developed and deployed a high-resolution, reproducible, and accessible smartphone-based platform that can be used for early identification and monitoring of individuals who are at risk of developing complications from diabetes. This involved reverse-engineering smartphones, characterizing them and tuning governing parameters to measure clinically relevant sensory response. She independently built and led collaborations between endocrinologists, neurologists, and primary care physicians at Stanford Hospital, designed and conducted user studies in over 150 adults with varying diabetic peripheral neuropathy risk, and established the foundation for predictive metrics. This entailed performing statistical tests and data visualizations to analyze the relationship between relevant electronic health record (EHR), health survey, and smartphone-based sensory perception data. She also won various grants to fund the projects and presented the project findings at various peer-reviewed conferences and journals.

In addition to developing platforms for monitoring people with diabetes, Dr. Adenekan also developed balance-enhancing controllers for wearable robots. This involved developing real-time software-based methods of controlling wearable robotic devices (exoskeletons) to enhance balance ability in older adults. She designed and conducted human subject pilot experiments using biomechanics tools (EMG, Respirometry, Motion Capture, Force plates), custom signal processing and visualization scripts, and simulation platforms (OpenSim) to study human response to exoskeletons. Additionally, Dr. Adenekan has also applied machine learning to various fields including exercise feedback, infection prediction, and biofilm identification.

At Exponent, Dr. Adenekan aims to collaborate with clients who are committed to developing accessible technologies and interventions that improve health.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Stanford University, 2024

M.S., Mechanical Engineering, Stanford University, 2019

B.S., Mechanical Engineering, Massachusetts Institute of Technology (MIT), 2017

Stanford Center for Diabetes Research Center Pilot Grant Awardee, 2023-2024

Stanford Center for Digital Health Pilot Grant Awardee, 2023-2024

Stanford Precision Health and Integrated Diagnostics Center Pilot Grant Awardee, 2022-2024

National Science Foundation Graduate Research Fellow 2019-2022

Stanford Graduate Fellow (Medtronic Foundation Fellow) 2017-2020

Stanford Enhancing Diversity in Graduate Education Fellow 2019

MIT Lincoln Labs Undergraduate Research and Innovations Scholar 2015-2016

Prior Experience

Postdoctoral Researcher, Mechanical Engineering, Stanford University, 2024

Research Lead /PhD Candidate, Mechanical Engineering, Stanford University, 2017-2024

Teaching Assistant, Biomechanics of Movement ME281, Stanford University, 2021

Research Assistant, Mechanical Engineering, Politecnico di Milano (via MIT MISTI), 2017

High School STEM Instructor, MIT Global Teaching Labs, Institut Public La Llauna High School in Spain, 2017

New Product Development Engineering Intern, Medtronic, 2016

Undergraduate Research Assistant, Mechanical Engineering, Massachusetts Institute of Technology, 2014-2016

Professional Affiliations

Diabetes Technology Society, Community Member, 2024-Present

IEEE Engineering in Medicine and Biology Society, Member, 2022-Present

IEEE Robotics and Automation Society, Member, 2022-Present

Publications

R. A. G. Adenekan, K. T. Yoshida, A. Benyoucef, A. Gonzalez Reyes, A. E. Adenekan, A. M. Okamura, and C. M. Nunez (2024) Reliability of Smartphone-Based Vibration Threshold Measurements. IEEE Haptics Symposium. Best Paper Award Finalist

R. A. G. Adenekan, A. Gonzalez Reyes, K. T. Yoshida, S. Kodali, A. M. Okamura, and C. M. Nunez (2024) A Comparative Analysis of Smartphone and Standard Tools for Touch Perception Assessment Across Multiple Body Sites. IEEE Transactions on Haptics.

C. A. Nattoo, C. E. Winston, and R. A. G. Adenekan (2024). How You Got Me Messed Up: A Critical Analysis of Doctoral Engineering Education through the Lens of Black PhD Candidates. ASEE Annual Conference & Exposition Proceedings.

K. T. Yoshida*, J. X. Kiernan*, R. A. G. Adenekan, S. H. Trinh, A. J. Lowber, A. M. Okamura†, and C. M. Nunez† (2023) Cognitive and Physical Activities Impair Perception of Smartphone Vibrations. IEEE Transactions on Haptics.

Y. S. Joung, R. B. Ramirez, E. Bailey, R. Adenekan, and C. R. Buie (2017). Conductive hydrogel films produced by freestanding electrophoretic deposition and polymerization at the interface of immiscible liquids. Composites Science and Technology,153, 128-135

Presentations

R. A. G. Adenekan (2024), Smartphone-based Sensory Testing: An Avenue for Early Detection and Monitoring of Patients at Risk of Developing Complications from Diabetes. Stanford Diabetes Research Symposium, Invited Talk.

R. A. G. Adenekan, A. E. Adenekan, S. H. Kim, K. K. Leung, S. Muppidi, M. Tan, S. P. Tsai, A. M. Okamura, C. M. Nunez, and K. T. Yoshida (2024), Feasibility of Using Smartphone-Based Vibration Perception Assessments for Monitoring of Sensory Function in Adults at Risk of Developing Complications from Diabetic Peripheral Neuropathy. Diabetes Technology Society's Diabetes Technology Meeting, Poster

R. A. G. Adenekan, A. M. Okamura (2024), Feasibility of Using Smartphone Vibrations to Detect Sensory Deficits in Adults with Pre-diabetes and Type 2 Diabetes. Stanford Center for Digital Health Symposium, Poster

R. A. G. Adenekan, A. Gonzalez Reyes, K. T. Yoshida, A. M. Okamura†, and C. M. Nunez† (2023) Vibration Sensory Threshold Measurement Using Mobile Devices. At Stanford eWear Annual Meeting Symposium, Poster.

R. A. G. Adenekan, A. J. Lowber, B. N. Huerta, A. M. Okamura, K. T. Yoshida†, and C. M. Nunez† (2022) Feasibility of Smartphone Vibrations as a Sensory Diagnostic Tool. In EuroHaptics, Poster.

R. Adenekan, S. H. Collins (2019) Balance enhancing controller for an ankle exoskeleton. In Dynamic Walking, Poster.

R. Adenekan, H. Yuk, X. Zhao (2016) Hydrogel Neural Probe. In MIT EECSCon, Poster.

Peer Reviews

Invited to review a journal paper for Scientific Reports, but declined due to a conflict of interest.