

Wearable Electronic Devices

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Faculty Mentor: Dr. Jonathan Claussen

Project Mentors: Shaowei Ding & Suprem Das

Interns: Oguerekhian Addeh, Makenzie Peterson, Gabriel Wright

Wearable electronic devices for personal health monitoring are becoming increasingly popular. Current market technology are capable of monitoring electrical or physical body changes such as heart rate and body movements (e.g., stairs climbed) from embedded electrical sensors, accelerometers, or altimeters. However, there are no commercially available sensors that can measure biochemical analytes in the sweat. Such sweat biochemical analytes or “biomarkers” are associated with a wide variety of health conditions including dehydration, muscle fatigue, mental stress, trauma, and infection. This project will use advanced manufacturing techniques including nanotechnology to develop sensors that can measure sweat biomarkers. Students will work on developing three-dimensional, textile microfluidics to wick sweat through fabrics and on developing a ink jet printed sweat sensor on the fabric with nanomaterials. The project will include theoretically and experimentally verifying the movement of sweat through textile microfluidics to a printed sensor using fundamental fluid dynamic equations and a variety of research experiments. The project will also include learning how to use a modified ink jet printer to print nanomaterial ink onto a textile for use as a sweat sensor.