

Wearable Biosensors

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Evaluation of nanostructured biosensors inkjet printed on textiles

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Wearable technologies such as the Fitbit and Apple Watch® are empowering and motivating users to take control of their health by collecting and analyzing continuous physical data such as heart rate, distance traveled, and steps climbed. Integrating electrochemical sensors into clothing has the potential to allow for the collection of a vast array of biochemical data across a user's body while requiring only the effort of getting dressed as one normally does. This project will entail developing sweat-biosensors that will collect data on an athlete's performance by monitoring analytes such as glucose, lactate, and electrolytes in sweat. Students will design and inkjet print conductive biosensing materials directly onto textiles and other body worn materials. The developed biosensors will be tested in the laboratory to characterize their sensing range, detection limit, and durability. Students will statistically analyze the collected data and strategize on how the data could be transmitted and assessed in a smartphone or smartwatch app. Research teams will walk away from this project with fundamental knowledge of how to design and fabricate wearable biosensors, perform electrochemical characterization experiments in a chemical laboratory environment, statistically analyze biosensor data, and brainstorm software tools to present continuous streams of data to an end-user in a simple yet informative manner.