
Plan Overview

A Data Management Plan created using DMPTool

Title: Micro-biosensor devices for Biochemical Analysis Applications

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Template: NSF-ENG: Engineering

Project abstract:

A biosensor is generally defined as an analytical device that converts the biological response into a quantifiable and measurable signal via a transducer. There is an urgent need in the diagnostics laboratories for accurate, inexpensive and fast response devices. In this dissertation, we introduce a novel Micro bio-sensor system that integrate microfluidics (polymer-based devices and paper-based devices) and bio-sensor system (optical sensor and electrochemical sensor) that provides great potential to be used as a powerful tool for point of care (POC) diagnostics and environmental monitoring.

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Micro-biosensor devices for Biochemical Analysis Applications

Roles and responsibilities

The DMP should clearly articulate how "sharing of primary data" is to be implemented. It should outline the rights and obligations of all parties as to their roles and responsibilities in the management and retention of research data. It must also consider changes to roles and responsibilities that will occur should a principal investigator or co-PI leave the institution. Any costs should be explained in the Budget Justification pages.

Ph.D. student Han Zhang will design, fabricate and evaluate the biosensor devices. the data from the proposed project will be generated and stored by Han Zhang
PI Prof. Anhong Zhou will be the project lead for all activities related to project management including management and preservation of the data after the graduation of the students.

Expected data

The Data Management Plan should describe the types of data, samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project. It should then describe the expected types of data to be retained.

The data can be collected in many ways.

1. The Renishaw inVia Raman spectrometer connected to a Leica microscope will be used for the extracellular vesicles (EVs) Raman spectra collection. As to Softwares, Renishaw Wire 3.4 will be used for data collection and processing, the datasets will be export to text files for future plotting and analysis. Matlab R2018a will be used for Principal Component Analysis (PCA) for EVs classification. the size of the file should be less than 1GB

2. The image of the fabricated devices will be taken and saved as Tif files for future reference.

3. For the glucose colorimetric detection, the color intensity results will be captured by smartphone camera and commercially available scanner. the image will be saved as Tif files. The software, ImageJ will be used to convert RGB pixels to gray value for Calibration.

Period of data retention

The DMP should describe the period of data retention. Minimum data retention of research data is three years after conclusion of the award or three years after public release, whichever is later.

All data generated will be archived on a minimum of two sets of hard drives, and will be maintained for a minimum of 7 years after termination or completion of this research project.

Data formats and dissemination

The DMP should describe the specific data formats, media, and dissemination approaches that will be used to make data available to others, including any metadata. Policies for public access and sharing should be described, including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements.

Research centers and major partnerships with industry or other user communities must also address how data are to be shared and managed with partners, center members, and other major stakeholders. Publication delay policies (if applicable) must be clearly stated. Investigators are expected to submit significant findings for publications quickly that are consistent with the publication delay obligations of key partners, such as industrial members of a research center.

Data generated from the project will be published in summarized formats in journal articles, conferences and seminar presentations.

In addition to publishing the data, full data sets from this work will be available through email request after publication. Upon request, PI-Prof Anhong Zhou will provide guest download access.

Data storage and preservation of access

The DMP should describe physical and cyber resources and facilities that will be used for the effective preservation and storage of research data. In collaborative proposals or proposals involving sub-awards, the lead PI is responsible for assuring data storage and access.

All data generated will be archived on a minimum of two sets of hard drives one each in possession of the PI and Students. In addition, we will use an additional, offsite cloud-based backup of all data (Utah State supported RedBoomerang [redboomerang.com] or Carbonite [carbonite.com]) by working with IT Helpdesk at Utah State University.