

James & Esther King Biomedical Research Program

Fan, Z. Hugh

*Mechanical and Aerospace Engineering
University of Florida*

*2009 Program
Bridge (1-year project)*

Project Title: Two-Dimensional Electrophoresis Device for Biomarker Detection

Project Summary: Proteomics, the large-scale study of proteins, is one of the emerging tools for drug discovery and medical diagnostics. Two-dimensional gel electrophoresis is one of the most potent methods in proteomics studies. The purpose of this grant is to develop a lab-on-a-chip device that will improve the performance of conventional gel electrophoresis. Two separation mechanisms will be integrated with microvalves and other components in the device. The device will address the key drawbacks of the current method, including poor reproducibility and time-consuming processes. The impact of the research could be significant because gel electrophoresis is widely used in biological laboratories. After the platform is successfully implemented, it could become a method for studying the association between biomarkers and diseases including those related to tobacco use. After the biomarkers are established and clinically validated, the platform could also become a rapid, quantifiable diagnostic tool to help physicians determine the seriousness of diseases based on the level of the biomarkers present in patients' bodily fluids.