Student projects - open enrollment with different size projects
giving different numbers of credits.

LC-MS clinical chemistry validation and machine learning studies in gastroenterology

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A new UPLC-MS instrument was recently installed to analyze new analytes for clinical chemistry applications. Emphasis is gastroenterology since this is our subject area, but other biomedical areas can be considered. Analytes are numerous, ranging from established routine clinical chemistry analytes to completely novel analytes for basic research. Other techniques such as gold standard methods, will be used for comparison as needed. As assays are validated, human, animal and other samples will be analyzed as part of basic, preclinical and clinical studies. The student will learn about processing biological specimens (e.g., blood, urine, probiotics), operating and analyzing UPLC-MS, plate readers, etc, as well as details of validating a new method. As there are a number of different projects of varying sizes, initiation and completion dates and number of credits can be negotiated. Suitable applicants would most likely be in a chemistry or bioinformatics program. Ability to calculate concentrations and use pipetters is an absolute requirement and will be checked prior running experiments. A new project has been initiated to pursue machine learning of LC-MS scan data to identify new biomarkers. The candidate for this project must display a strong interest and aptitude in bioinformatics and R programming. This work will involve peak detection from large data sets and working with data arrays and finally machine learning to differentiate subgroups of patients. This project will begin with a smaller data set with obvious differences to test algorithms. We are open to collaborations with other groups as shared supervisors for those needing access to an UPLC-MS, as our instrument is not currently heavily occupied. Because we work with human patients, we urge anyone joining us to explore vaccination for hepatitis B. We look forward to seeing some of you choose gastroenterology for your projects.