Statement of Research Interests and Goals

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My research interests and activities over the past five years have mainly centered around the following three areas: 1) DNA methylation based association study and biomarker identification leverage high dimensional dataset, 2) Genome-wide DNA methylation profile (methylome) drafting for the genome of human normal cells or complex disease with NGS technique, 3), Population based association study between genetic variants (SNP, CNV) and complex disease. The title of my Ph.D. thesis is *“Cancer Biomarker Research Based on Genome-wide DNA methylation Profile: Diagnosis and Prognosis”,* in which I tried to build some DNA methylation based diagnostic/prediction models for several cancer diseases with different study design, DNA methylation detection method and different statistic and machine learning methods.

More Recently, I have started working in Dr. Momiao Xiong’s lab on gene-gene, gene-environment and epitasis interaction identification project, in which I am trying to introduce DNA methylation into the models to identify the regulation role of DNA methylation on gene expression and disease initiation and progress. In addition, I want to propose a new method based on Functional Principle Components Aanlaysis (FPCA), to detect differential DNA methylation regions with MBD-seq or MethylCap-seq dataset.

More details can be extended with requirement or in the interview.

**Future Goals**

I am deeply interested in all kinds of question about DNA methylation, such as DNA methylome difference between different species, tissues and different disease status, DNA methylation based biomarkers, novel DNA methylation detection methods, the evolution of DNA methylation modification system.

On the other side, I want to do some works on mGwas (methylation based genome-wide association study), meQTL(methylation based quantitative trait loci), Interaction contribution to gene expression between DNA methylation and genetic variants (SNP, CNV), DNA methylation heritability in the populations and specific disease,