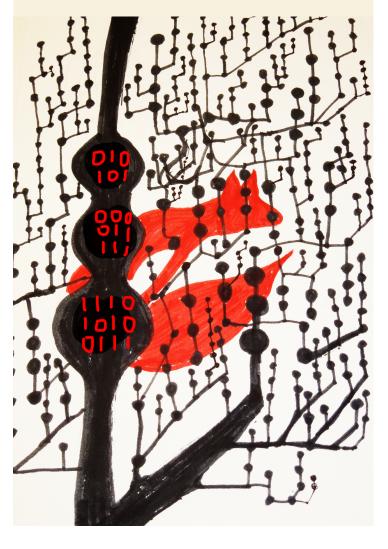# Quantitative Genomics and Genetics
PHC 6934
Spring 2017 Wednesday 5-7 pm

Cutting edge technology
Real world problem solving

Course Director
Rays Jiang, PhD

Assistant Professor
Computational Biology
Department of Global Health
COPH, University of South Florida

Dr. Rays Jiang has been a pioneer in solve data analytical problems of cutting edge high throughput technologies. Her lab integrates computation and experimental approaches to tackle unanswered biological questions.

Course Aims
(Course content in the back page)

Quantitative genetic and genomic concepts

Analytical skills development

Real world case study

Lecturers

Deborah Cragun, PhD
Assistant Professor
Department of Global Health
Program Director MPH/MSGC
Dual Degree

Lynn Marty, PhD
Associate Professor
Department of Integrative Biology

Michael White, PhD
Professor of Global Health
Deputy Director of Center for Drug Discovery and innovation

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SECTION 1- Fundamental concepts in quantitative genetics and genomics

1: Introducing fundamental concepts of genetics and genomics

2: Population genetics – introducing allele frequencies, Hardy-Weinberg equilibrium, and genetic selective forces.

3: Evolutionary genetics –Integrating genetics and Darwinian evolution; introducing phylogenetic and coalesce analysis.

4: Genotype and environmental interactions- Introducing genotype and phenotypes in the context of genomics

5: Risk assessment -Introducing basic methods and focusing on Bayesian pedigree analysis

SECTION 2 - Essential skills in statistical genomics

7: Comparative genomics-Introducing basic concepts and computational tools for comparing and analyzing genomes

8: Epigenetics and genomics – Introducing different layers of current epigenetics research and related analytic methods

9: Population genomics- Introducing genomics in the context of epidemiology.

10: Genetic variant analysis-Introducing basic concepts and methods for genetic variants detection in large genomic data sets

11: Quantitative trait analysis – introducing quantitative trait mapping and different types of QTL analysis such as eQTL, pQTL, and reQTL.

SECTION 3 - Workshop of sequencing technology and hands-on data analysis experiences

12: Workshop on Next Generation Sequencing work flow

13: Hands-on genomics data analysis