Statistical Genetics and Genomics
EPP 531/CRN 52303

MW, 2:30 - 4:25 pm, PBB 113
Instructor: Dr. Bode A. Olukolu (bolukolu@utk.edu)

Course Description
An intensive introduction to modern analytical methods and tools for genetic and -omics data. Class activities will include lectures, review of literature, and computational laboratory sessions. Hands-on experience during laboratory sessions will provide a step-by-step guide through analytical pipelines.

Value Proposition
Considering the rapid pace of changing technologies, students need to develop critical evaluation skills and the ability to learn independently. The ensuing big data from these technological advances allows for powerful ways to interrogate biological systems. However, this poses new challenges and need for skill set that integrate data science and bioinformatics into genetic and genomic studies. Emphasis on specific topics and class projects will be student-driven with the aim of addressing immediate research needs.

Student Learning Outcomes/Objectives
1. Students will have basic competence with coding in Unix and R software.
2. Students will understand classical genetic and genomic principles/ methods, as well as contemporary analytical methods.
3. Students will have the ability to effectively communicate these concepts/methods, gain mastery of analytical software/tools for their own research, and evaluate other researchers’ work.

<table>
<thead>
<tr>
<th>Introduction to coding in Unix &amp; R software</th>
<th>Next-generation sequencing, QC and data filtering</th>
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<tbody>
<tr>
<td>Genetic Linkage mapping and QTL analysis</td>
<td>Variant calling from high-throughput NGS data</td>
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<td>Genome-wide association analysis</td>
<td>Metagenome analysis of microbiomes</td>
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<td>Genomic selection/prediction</td>
<td>Transcriptome analysis (RNA-seq)</td>
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*A laptop is required for class and lab sessions*