**Clinical and Research Genomics Assignment #3**

**From Lecture\_07-09 (April 4th):**

**RNA-Sequencing, Epigenomes, DNA Modifications, and Chromatin Dynamics \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Assignment: Answer questions about epigenomics and DNA modifications**

**Due Date: 5:00PM on April 21st**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Epigenome and DNA Modifications**

Analyze and Contextualize DNA Methylation data from a RRBS experiment

If you do not already have it installed, install the free statistical program R on your computer:

<http://www.r-project.org/>

You can use the slides on this blog to understand the algorithms that we have discussed in class:

<http://zvfak.blogspot.com/2013/03/epiworkshop-2013-dna-methylation.html>

If you have trouble getting the package for R from the tutorial, you can download it here:

<http://code.google.com/p/methylkit/>

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Utilize the tutorial to familiarize yourself with R and the program.

Then, from the test dataset within the package, your assignment is to:

1. Check if there is an indication of PCR bias in the experiment.
2. Calculate # of differentially methylated cytosines (DMCs)
3. Annotate the DMCs with genes and discuss implications of that annotation.
4. Check correlation between samples.
5. Cluster samples to see if replicates cluster together

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Please hand the assignment on the day of the lecture, or email if you cannot attend.**

**For any questions, please contact Chandrima Bhattacharya (**[**chb4004@med.cornell.edu)**](mailto:chb4004@med.cornell.edu))**, Ebrahim Afshinnekoo (**[**eba2001@med.cornell.edu**](mailto:eba2001@med.cornell.edu)**), or Professor Mason (**[**chm2042@med.cornell.edu**](mailto:chm2042@med.cornell.edu)**)**