Day 1.

**Morning (9am-12pm)**

Plan A: 9:00-9:15 Introduction of DHL and Jay,  
9:15-9:45 Student introductions  
3x5 index cards – maybe have students fill them out without names, then exchange and play a ‘guess who’ type game?  
9:45-10:15 Development of Community Standards and Course Goals  
Large sheet of paper to hang in the lab, have TA generate similar on smaller sheet of paper to make copies. Have students sign large version – base it in the CTY honor code – respect for self, respect for others, respect for experiment  
10:15-10:30 BREAK  
10:30-11:15 What is Genomics? What can you do with a genome?  
11:15-12:00 Pre-test

Plan B: If additional time, start lab prep and introduce informatics project.

**Afternoon (1pm-3pm)**

Plan A: 1:00-1:15 Lab safety  
1:15-2:00 Pick colonies for Env. Lab. (perhaps do this in 2 rotations with TA?)  
2:00-2:15 BREAK  
2:15-3:00 Lab Technique Challenge

Plan B:

**Evening (7pm-9pm)**

Plan A: 7:00-7:45 Review of genetics  
7:45-8:00 BREAK  
8:00-9:00 Introduce Informatics project, organize computers, Pick gene from OMIM, Read articles introducing genomics (Collins, see GENE folder, Genome Primer)

Plan B:
Day 2.

**Morning (9am-12pm)**

Plan A: 9:00-10:15  Review for Transcriptional regulation and gene expression in eukaryotes
         10:15-10:30  BREAK
         10:30-12:00 Introduce concept of organism as a system, think through examples

Plan B: 

**Afternoon (1pm-3pm)**

Plan A: 1:00-2:00  Env. Lab day 2 (if colonies are grown!)  if not, need back-up plan,
         2:00-3:00  Halobacter simulation activity (do write-up to make this more engaging)

Plan B: This is probably going to be too short – find other things to do!

**Evening (7pm-9pm)**

Plan A: 7:00-8:00  p. 103, 342-365, read + problems
         8:00-9:00  Introduce KEGG and Biosystems, Research where your gene fits in its own network.

Plan B:
Day 3.

**Morning (9am-12pm)**

Plan A: 9:00-9:15 Review yesterday’s material  
9:15-10:30 Other mechanisms to regulate gene expression: epigenetics  
10:30-10:45 BREAK  
10:45-12:00 Epigenetics review papers,

Plan B: If this is too short, read Jaenisch and Spivakov papers

**Afternoon (1pm-3pm)**

Plan A: 1:00-2:00 Env. Lab, if ready  
2:00-3:00 Epigenetics ‘plays’ & evaluation

Plan B:

**Evening (7pm-9pm)**

Plan A: 7:00-8:00 Find function and regulation of gene using OMIM and Pubmed sources  
8:00-8:15 BREAK  
8:15-9:00 Read p.34-58, Add problems

Plan B:
Day 4.

**Morning (9am-12pm)**

Plan A: 9:00-9:15 Review yesterday’s material
9:15-10:30 What is a genome made of? How do we define its structure?
10:30-10:45 BREAK
10:45-12:00 Mechanisms of understanding a gene/genome structure
  Restriction enzymes, mapping, Creation of YACs, Sanger sequencing and Assembly, HGP

Plan B:

**Afternoon (1pm-3pm)**

Plan A: 1:00-3:00 Env. Lab, gel and gel extraction, BSCS Assembly module (#1 and 2)

Plan B: If there are large gaps read DNA Sequencing papers, BSCS Human Genome Module

**Evening (7pm-9pm)**

Plan A: 7:00-8:00 Find Gene sequence and structure of your gene
8:00-9:00 Review for self-assessment, Read 83-100 + problems.

Plan B:
Day 5.

Morning (9am-12pm)

Plan A: 9:00-9:15  Review yesterday’s material
9:15-10:30  Review Mutations and Alleles, Systems Biology, Introduce New Sequencing methods
10:30-10:45  BREAK
10:45-12:00  QUIZ 1

Plan B:

Afternoon (1pm-3pm)

Plan A: 1:00-2:00  Why sequence a genome? Read & Present
2:00-3:00  Complete any leftover lab tasks

Plan B:

Evening (7pm-9pm)

Plan A: 7:00-8:00  Research epigenetic regulation of your gene
8:00-9:00  Read 234-254 + problems
Day 6.

**Morning (9am-12pm)**

Plan A:  9:00-9:15  Review of Gene Expression  
         9:15-10:30  Introduction to Microarray technology via complementarity and use of RNA abundance as a biomarker for cell health/development  
         10:30-10:45 BREAK  
         10:45-11:15 Microarray activity  
         11:15-12:00 Microarray Presentations

Plan B:

**Afternoon (1pm-3pm)**

Plan A:  1:00-2:00  Research gene expression of your gene under different conditions  
         2:00-3:00  NEED ANOTHER LAB ACTIVITY, possible DNA Microarray tour? Or microarray module from S. Porter

Plan B:

**Evening (7pm-9pm)**

Plan A:  7:00-8:00  Read 254-261, 264-273 + problems?  
         8:00-9:00  Prep for NISC, explore their website, think about the types of projects they currently do/ should do.
Day 7.

**Morning (9am-12pm)**

Plan A: 9:00-12:00 NISC TOUR

Plan B:

**Afternoon (1pm-3pm)**

Plan A:  NISC tour?

Plan B:  Start discussion of how we measure protein.

**Evening (7pm-9pm)**

Plan A: 7:00-8:00  Why isn’t RNA a good measure of protein abundance? Regulation of translation. How do we measure proteins? What can proteins tell us that RNAs can’t?

8:00-9:00  286-306 + problems

Plan B: If extra time, to online proteomics tools from GNIC folder
Day 8.

**Morning (9am-12pm)**

Plan A: 9:00-9:15  Review yesterday’s material
         9:15-10:30  Review evolution and genetics. Start thinking about how we can use this information to understand gene function.
         10:30-10:45 BREAK
         10:45-12:00  How do we perform pairwise alignment? Online game from Laura

Plan B:

**Afternoon (1pm-3pm)**

Plan A: 1:00-2:00  Phylogeny lab
         2:00-3:00  Literature analysis + discussion

Plan B:

**Evening (7pm-9pm)**

Plan A: 7:00-8:00  Use BLAST to find DNA homologs to your genes. Can you learn anything about the gene’s function?
         8:00-9:00  Read 114-137 + problems
Day 9.

**Morning (9am-12pm)**

Plan A: 9:00-9:15  Review yesterday’s work  
9:15-9:45  Review Hardy-Weinberg and evolution in general  
9:45-10:45  SNPs and mechanisms of genome evolution, human variation and QTL  
10:45-11:00  BREAK  
11:00-12:00  Read p. 138-144, Discuss how we can use genome to change to evaluate human origins  

Plan B:  

**Afternoon (1pm-3pm)**

Plan A: 1:00-3:00  PV92 lab with informatics portion if at all possible!  

Plan B: In down time, read Tiskoff and Wells papers + discuss  

**Evening (7pm-9pm)**

Plan A: 7:00-8:00  Use ClustalW/Homologene to find evolutionary history of your gene  
8:00-9:00  Read 186-202 + problems, review for Quiz 2
Day 10.

**Morning (9am-12pm)**

Plan A: 9:00-9:15 Review yesterday’s materials
9:15-10:00 QUIZ 2
10:00-11:00 Watch Wells Video on human migration
11:00-11:15 BREAK
11:15-12:00 NEED SOMETHING HERE

Plan B:

**Afternoon (1pm-3pm)**

Plan A: 1:00-2:00 Review statistical tests and probability and correlation from genetics
2:00-3:00 Consider applications to genomics, especially regulatory modules, gene expression, clustering, etc. Develop some practice problems. Math minute 2.2, 6.2

Plan B:

**Evening (7pm-9pm)**

Plan A: 7:00-9:00 Work on Gene Reviews, Evaluate novel regulatory mechanisms if possible (may need to redesign this). JASPAR? Then evaluate for all genes and chi-square test?
Day 11.

**Morning (9am-12pm)**

Plan A: 9:00-9:15 Review previous work  
9:15-10:00 Review heritability of complex traits, consider how you would find genes responsible for traits  
10:00-10:45 Read “What’s wrong with my child” p. 3-29 and work through the problems  
10:45-11:00 BREAK  
11:00-12:00 Discuss forward genetic screens and HAPMAP project

Plan B:

**Afternoon (1pm-3pm)**

Plan A: 1:00-3:00 HAPMAP case study, Read HAP-MAP paper and discuss GWAS studies  

Plan B:

**Evening (7pm-9pm)**

Plan A: 7:00-8:00 Center Scholars Talks?  
8:00-9:00 Prep for Feinberg Lab, Review epigenetics, discuss major works
Day 12.

**Morning (9am-12pm)**

Plan A: 9:00-12:00  FEINBERG LAB TOUR

Plan B:

**Afternoon (1pm-3pm)**

Plan A: FEINBERG LAB TOUR?

Plan B: Introduce metagenomics and biome projects

**Evening (7pm-9pm)**

Plan A: Finish Booklets on genes
Day 13.

Morning (9am-12pm)

Plan A: 9:00-9:15 Review yesterday’s materials
        9:15-10:15 Introduce other ‘omics, specifically metagenomics, introduce idea of a ‘core’ genome vs. a ‘pan’ genome
        10:15-10:30 BREAK
        10:30-12:00 Discuss human microbiome and earth microbiome projects. DNA Barcoding activity.

Plan B:

Afternoon (1pm-3pm)

Plan A: 1:00-1:30 Introduce Pharmacogenomics
        1:30-3:00 Case Study, Chapter 9 p331-330

Plan B: Develop ethics questions for evening research. What use of genetic materials? What harm?

Evening (7pm-9pm)

Plan A: 7:00-9:00 Research ethics questions and develop presentation (~5 min per student)
Day 14.

Morning (9am-12pm)

Plan A: 9:00-9:30 Finish Research
       9:30-10:00 Clean-up lab
       10:00-12:00 ELSI Presentations

Plan B:

Afternoon (1pm-3pm)

Plan A: 1:00-2:00 Review materials from session
       2:00-3:00 Final assessment

Plan B:
Day 15.

**Morning (9am-12pm)**

Plan A: Research talks from Inst/TA
   What have you learned?
   Name that organism?

Plan B: