

# BIMM 172 - Genome Science - Briggs [WI20]

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### BIMM172 Genome Biology WI20 Syllabus

#### Assigned reading:

1. Jan 6 – DNA Sequencing: The third revolution in sequencing technology - Prof Briggs
2. Jan 8 – Prokaryotic Genomes: Bacterial genes outnumber archaeal genes in eukaryotic genomes - Darren Lam, Alexander Choi
3. Jan 10 – Microbiome: Vulnerability of the industrialized microbiota (review) - Weishan Li, Steve Zhang
4. Jan 13 - Microbiome: Microbiomes as sources of emergent host phenotypes (review) - Darren Lam, Alexander Choi
5. Jan 15 - Microbiome: T cell-mediated regulation of the microbiota protects against obesity - Wai Lin, Hector Hueso
6. Jan 17 - Microbiome: continued. Perspective by Wang
7. Jan 20 - MLK Day
8. Jan 22 - Microbiome: Spatial metagenomic characterization of microbial biogeography in the gut - Laura Varey, Cindy Garcia
9. Jan 24 – Genotype to Phenotype: Advances in epigenetics link genetics to the environment and disease (review) - An-Chih Chen, Zhiqi He
10. Jan 27 - Genotype to Phenotype: Genome-wide perturbation of retroviral LTRs (and commentary) - Kathleen Cummings, Lilian Von Husen
11. Jan 29 - Genotype to Phenotype: The forebrain synaptic transcriptome is organized by clocks but its proteome is driven by sleep
12. Jan 31 - Genotype to Phenotype: continued
13. Feb 3 – Genome Annotation: Identification of the expressome by machine learning on omics data
14. Feb 5 – Single-Cell Genomics: Multi-omics profiling of mouse gastrulation at single-cell resolution - Steven Manalena
15. Feb 7 – Single-Cell Genomics: continued. Mapping human cell phenotypes to genotypes with single-cell genomics (review) - Steven Manalena
16. Feb 10 – Genome Architecture: LHX2- and LDB1-mediated trans interactions regulate olfactory receptor choice - Lucas Dantas de Paula, Runfan Yang
17. Feb 12 - Genome Architecture: continued. Perspective by Spitz
18. Feb 14 – Genome Architecture: Circular ecDNA promotes accessible chromatin and high oncogene expression -
19. Feb 17 - President's Day
20. Feb 19 - Phase-Separated Compartments: Probing and engineering liquid-phase organelles (review) - Laura Varey, Cindy Garcia
21. Feb 21 – Phase-Separated Compartments: DEAD-box ATPases are global regulators of phase-separated organelles - An-Chih Chen, Zhiqi He

22. Feb 24 – CRISPR: Programmed large-scale genome rearrangement and assembly - Steve Zhang, Weishan Li
23. Feb 26 – CRISPR: Search-and-replace genome editing - Daniel Lusk, Santiago Fassardi
24. Feb 28 – CRISPR: continued. Perspective by Platt
25. Mar 2 – CRISPR: Transposon-encoded CRISPR–Cas systems direct RNA-guided DNA integration - Daniel Lusk, Santiago Fassardi
26. Mar 4 - Synthetic Lethals: WRN helicase is a synthetic lethal target in microsatellite unstable cancers - Kathleen Cummings
27. Mar 6 – Genomics and Society: Facial recognition from DNA using face-to-DNA classifiers - Wai Lin, Hector Hueso
28. Mar 9 – Genomics and Society: Reconstructing Denisovan Anatomy Using DNA Methylation Maps. Commentary by Price
29. Mar 11 - Genomics and Society: The genome of the offspring of a Neanderthal mother and a Denisovan father. Commentary by Gibbons Mar 29 2019 and Jan 3 2020 - Erick Esqueda, Lynn Nguyen
30. Mar 13 - Genome Competition: The biomass distribution on Earth - Erick Esqueda, Lynn Nguyen

## Grades

Written analyses (24) = 50%. 0 = poor understanding; 1 = good understanding; 2 = excellent understanding. Written analyses should normally require 300-500 words. Students can help each other to understand the papers. All text must be original with no copying from each other or other sources.

Class participation = 50%. Two shared presentations plus multiple opportunities to present figures and add comments and questions.

Shared presentations = 10%. Presenters will describe the Why and How of the paper. After discussion by the class of What (the figures), the presenters will summarize the conclusions and speculate on societal impacts.

Figure presentations/comments = 40%. Students will confer in small groups for 3 minutes to finalize their preparation then the presenters will pick a name from the bucket to describe and interpret the next figure. All students should add to this discussion with questions and comments.

There are no make-ups. Early submission of written analyses will be accepted.

## Grading Scale

**A** = 90-100%













**B** = 80-89%

**C** = 70-79%

**D** = 60-69%

**F** = 59%-below

## Course Summary:

Date	Details	
Tue Jan 7, 2020	 <b>1. Jan 6 – DNA Sequencing: The third revolution in sequencing technology</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66843">https://canvas.ucsd.edu/courses/8727/assignments/66843</a> )	due by 8am
Thu Jan 9, 2020	 <b>2. Jan 8 – Bacterial genes outnumber archaeal genes in eukaryotic genomes</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66845">https://canvas.ucsd.edu/courses/8727/assignments/66845</a> )	due by 8am
Sat Jan 11, 2020	 <b>3. Jan 10 – Microbiome: Vulnerability of the industrialized microbiota</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66847">https://canvas.ucsd.edu/courses/8727/assignments/66847</a> )	due by 8am
Tue Jan 14, 2020	 <b>4. Jan 13 - Microbiome: Microbiomes as sources of emergent host phenotypes</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66850">https://canvas.ucsd.edu/courses/8727/assignments/66850</a> )	due by 8am
Thu Jan 16, 2020	 <b>5. Jan 15 - Microbiome: T cell-mediated regulation of the microbiota protects against obesity</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66853">https://canvas.ucsd.edu/courses/8727/assignments/66853</a> )	due by 8am
Thu Jan 23, 2020	 <b>8. Jan 22 - Microbiome: Spatial metagenomic characterization of microbial biogeography in the gut</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66854">https://canvas.ucsd.edu/courses/8727/assignments/66854</a> )	due by 8am
Sat Jan 25, 2020	 <b>9. Jan 24 – Genotype to Phenotype: Advances in epigenetics link genetics to the environment and disease</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66857">https://canvas.ucsd.edu/courses/8727/assignments/66857</a> )	due by 8am
Tue Jan 28, 2020	 <b>10. Jan 27 - Genotype to Phenotype: Genome-wide perturbation of retroviral LTRs</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66861">https://canvas.ucsd.edu/courses/8727/assignments/66861</a> )	due by 8am
Thu Jan 30, 2020	 <b>11. Jan 29 - Genotype to Phenotype: The forebrain synaptic transcriptome is organized by clocks but its proteome is driven by sleep</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66863">https://canvas.ucsd.edu/courses/8727/assignments/66863</a> )	due by 8am
Tue Feb 4, 2020	 <b>13. Feb 3 – Genome Annotation: Identification of the expressome by machine learning on omics data</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66865">https://canvas.ucsd.edu/courses/8727/assignments/66865</a> )	due by 8am
Thu Feb 6, 2020	 <b>14. Feb 5 – Single-Cell Genomics: Multi-omics profiling of mouse gastrulation at single-cell resolution</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66868">https://canvas.ucsd.edu/courses/8727/assignments/66868</a> )	due by 8am
Sat Feb 8, 2020	 <b>15. Feb 7 – Single-Cell Genomics: Mapping human cell phenotypes to genotypes with single-cell genomics</b> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66893">https://canvas.ucsd.edu/courses/8727/assignments/66893</a> )	due by 8am

Date	Details	
Tue Feb 11, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66895">16. Feb 10 – Genome Architecture: LHX2- and LDB1-mediated trans interactions regulate olfactory receptor choice</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66895">https://canvas.ucsd.edu/courses/8727/assignments/66895</a> )	due by 8am
Sat Feb 15, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66896">18. Feb 14 – Genome Architecture: Circular ecDNA promotes accessible chromatin and high oncogene expression</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66896">https://canvas.ucsd.edu/courses/8727/assignments/66896</a> )	due by 8am
Thu Feb 20, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66898">20. Feb 19 - Phase-Separated Compartments: Probing and engineering liquid-phase organelles</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66898">https://canvas.ucsd.edu/courses/8727/assignments/66898</a> )	due by 8am
Sat Feb 22, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66901">21. Feb 21 – Phase-Separated Compartments: DEAD-box ATPases are global regulators of phase-separated organelles</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66901">https://canvas.ucsd.edu/courses/8727/assignments/66901</a> )	due by 8am
Tue Feb 25, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66903">22. Feb 24 – CRISPR: Programmed large-scale genome rearrangement and assembly</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66903">https://canvas.ucsd.edu/courses/8727/assignments/66903</a> )	due by 8am
Thu Feb 27, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66904">23. Feb 26 – CRISPR: Search-and-replace genome editing</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66904">https://canvas.ucsd.edu/courses/8727/assignments/66904</a> )	due by 8am
Tue Mar 3, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66905">25. Mar 2 – CRISPR: Transposon-encoded CRISPR–Cas systems direct RNA-guided DNA integration</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66905">https://canvas.ucsd.edu/courses/8727/assignments/66905</a> )	due by 8am
Thu Mar 5, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66907">26. Mar 4 - Synthetic Lethals: WRN helicase is a synthetic lethal target in microsatellite unstable cancers</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66907">https://canvas.ucsd.edu/courses/8727/assignments/66907</a> )	due by 8am
Sat Mar 7, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66908">27. Mar 6 – Genomics and Society: Facial recognition from DNA using face-to-DNA classifiers</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66908">https://canvas.ucsd.edu/courses/8727/assignments/66908</a> )	due by 8am
Tue Mar 10, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66909">28. Mar 9 – Genomics and Society: Reconstructing Denisovan Anatomy Using DNA Methylation Maps</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66909">https://canvas.ucsd.edu/courses/8727/assignments/66909</a> )	due by 8am
Thu Mar 12, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66911">29. Mar 11 - Genomics and Society: The genome of the offspring of a Neanderthal mother and a Denisovan father</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66911">https://canvas.ucsd.edu/courses/8727/assignments/66911</a> )	due by 8am
Sat Mar 14, 2020	 <a href="https://canvas.ucsd.edu/courses/8727/assignments/66912">30. Mar 13 - Genome Competition: The biomass distribution on Earth</a> ( <a href="https://canvas.ucsd.edu/courses/8727/assignments/66912">https://canvas.ucsd.edu/courses/8727/assignments/66912</a> )	due by 8am