BIOM555 - REGULATION OF THE GENOME: SPRING 2021

**Lectures:** VIRTUAL: Tuesdays and Thursdays: 9:00 am – 10:30 am; Tuesday, January 19 through Thursday, April 29

**Small Group Discussions:** February 2 through April 29. Students choose one discussion session and attend that session each week. Attendance and participation are required.

A: Session 1: Thursday 11am ~ 12pm ~ TBD
B. Session 2: Thursday 11am ~ 12pm ~ TBD
C: Session 3: Thursday 3:30pm ~ 4:30pm ~ TBD
D. Session 4: Thursday 3:30pm ~ 4:30pm ~ TBD
E: Session 5: Fridays 11am - 12pm ~ TBD
F: Session 6: Friday 11am – 12pm ~ TBD

**Exams:** 3 Exams, equal weight (25% each exam) Start at 8:30 am, end at 10:20 am. No regrading by teaching assistants. For issues with exam grades, please make an appointment with one of the course directors.

**Course Directors:**
Roberto Bonasio: roberto@bonasiolab.org; 573-2598; 9-111 STRC
Klaus Kaestner: kaestner@pennmedicine.upenn.edu; 898-8759; 12-126 STRC

**Teaching Assistants:**
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**BGS Course Coordinator:**
Colleen Dunn: dunncoll@pennmedicine.upenn.edu; 898-2792; 160 BRB II/III

**Section 1 – Genome maintenance**
**Tuesday, January 19:** Course outline & introduction to next generation sequencing (Roberto Bonasio)
**Thursday, January 21:** DNA replication (Paul Lieberman)

**Tuesday, January 26:** Telomeres (Paul Lieberman)
**Thursday, January 28:** DNA repair and cell cycle checkpoints (Roger Greenberg)
Thursday/Friday (Discussion of problem set 1: DNA replication and telomeres)

**Tuesday, February 2:** Genome Editing (Jorge Henao-Mejia)

**Section 2 – Transcription**
**Thursday, February 4:** RNAseq, GROseq, and scRNAseq (Klaus Kaestner)
Thursday/Friday (Discussion of problem set 2: DNA repair and Genome editing)

**Tuesday, February 9:** Eukaryotic transcription I – (Ken Zareit)
**Thursday, February 11:** Eukaryotic transcription II – (Ken Zareit)
Thursday/Friday (Discussion of problem set 3: RNA seq/Transcription I)

**Tuesday, February 16:**  REVIEW SESSION FOR EXAM (TAs)
**Thursday, February 18:**  EXAM 1, VIRTUAL (Material up to February 11, inclusive)

**Section 3 – Chromatin Modifications**
**Tuesday, February 23:**  Nucleosome structure (Ben Black)
**Thursday, February 25:**  Epigenomic methods: BS-seq, ChIP-seq, ATAC-seq (Klaus Kaestner)

**Tuesday, March 2:**  DNA modifications (Marisa Bartolomei)
**Thursday, March 4:**  Imprinting (Marisa Bartolomei)
**Thursday/Friday (Discussion of problem set 4: Nucleosome structure, epigenomic methods)**

**Tuesday, March 9:**  Histone marks (Roberto Bonasio)

**Section 4 – Chromatin Regulation**
**Thursday, March 11:**  Polycomb (Roberto Bonasio)
**Thursday/Friday (Discussion of problem set 5: DNA modifications; Histones and Chromatin)**

**Tuesday, March 16:**  Trithorax and chromatin remodeling (Roberto Bonasio)
**Thursday, March 18:**  Analysis of higher-order chromatin structure:3C, 4C, HiC, FISH (Babak Faryabi)
**Thursday/Friday (Discussion of problem set 6: Histones, Chromatin, Polycomb)**

**Tuesday, March 23:**  Nuclear organization (Gerd Blobel)
**Thursday, March 25:**  REVIEW SESSION FOR EXAM (TAs)
**Thursday/Friday (Discussion of problem set 7: Trithorax, chromatin higher order structure and topology)**

**Section 5 – Coding and noncoding RNA regulation**
**Tuesday, March 30:**  EXAM 2, VIRTUAL (Material up to March 23)
**Thursday, April 1:**  RNA-centric techniques: CLIP-seq, ChIRP-seq, SHAPE-seq etc (Colin Conine)

**Tuesday, April 6:**  Small RNAs (Colin Conine)
**Thursday, April 8:**  Long non-coding RNAs (Colin Conine)
**Thursday/Friday (Discussion of problem set 8: RNA centric techniques)**

**Tuesday, April 13:**  RNA processing (Kristen Lynch)
**Thursday, April 15:**  RNA modifications (Kristen Lynch)
**Thursday/Friday (Discussion of problem set 9: Small and long non-coding RNAs)**

**Tuesday, April 20:**  RNA localization (Peter Klein)
**Thursday, April 22:**  Translational control (Peter Klein)
**Thursday/Friday (Discussion of problem set 10: RNA modifications and processing)**

**Tuesday, April 27:**  REVIEW SESSION FOR EXAM (TAs)
**Thursday, April 29:**  EXAM 3, IN CLASS

**General References for Review (Library/Web)**
Molecular Biology of the Cell (Alberts et al.)
Molecular Cell Biology Lodish et al. (older editions are by Darnell et al.)
### Email addresses for lecturers

<table>
<thead>
<tr>
<th>Lecturer</th>
<th>Email Address</th>
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*Genes VIII Benjamin Lewin*