**COMPBIO 293B Doctoral Seminar in Computational Biology**
Weds from 12-2pm for Fall 2018. The seminar will be held in 321 Stanley.

**Instructor:** Priya Moorjani, Dan Rokhsar (Fall)
**Offered:** FALL SEMESTER
**Units:** 2.0 (Letter Grade)
**Course Format:** Seminar
**CCN#:** CCB 293/ MCB 296
**Class size:** 22

**Course Description:** This one-year interactive seminar builds skills, knowledge and community in computational biology for first year PhD and second year Designated Emphasis students. Topics covered include concepts in human population genetics and evolutionary biology, statistical and computational methods for data analysis, critical review and discussion of current research studies and methods, preparation for success in the PhD program and career development. Faculty members of the graduate program in computational biology and scientists from other institutions will participate. Topics will vary each semester.

**Syllabus:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/22</td>
<td>Topics in Human Evolutionary Genetics Concepts in Population Genetics</td>
<td>Priya Moorjani</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Dan Rokhsar</td>
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<tr>
<td>2</td>
<td>8/29</td>
<td>Ancient DNA and human evolution</td>
<td>Priya Moorjani</td>
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<tr>
<td>3</td>
<td>9/5</td>
<td>Concepts in Population Genetics 2</td>
<td>Dan Rokhsar</td>
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<tr>
<td>4</td>
<td>9/12</td>
<td>Making inferences about human history and evolution from genetic data</td>
<td>Priya Moorjani</td>
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<td></td>
<td></td>
<td>Hands-on data analysis for ancestry inference</td>
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<tr>
<td>5</td>
<td>9/19</td>
<td>Student presentation/ Journal club Origin of modern humans and Out of Africa migration</td>
<td>Students</td>
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<tr>
<td>6</td>
<td>9/26</td>
<td>Student presentation/ Journal club Human-Neanderthals: species or populations?</td>
<td>Students</td>
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<tr>
<td>7</td>
<td>10/3</td>
<td>Student presentation/ Journal club Genetic uniqueness of humans</td>
<td>Students</td>
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<tr>
<td>8</td>
<td>10/10</td>
<td>Student presentation/ Journal club Recent human prehistory: Migrations, replacements and mixtures</td>
<td>Students</td>
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<tr>
<td>9</td>
<td>10/17</td>
<td>No class for ASHG</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
<td>Instructor</td>
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<tr>
<td>10</td>
<td>10/24</td>
<td>Student presentation/ Journal club Human Adaptation and Selection</td>
<td>Students</td>
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<tr>
<td>11</td>
<td>10/31</td>
<td>Student presentation/ Journal club Genetic basis of Phenotypic variation</td>
<td>Students</td>
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<tr>
<td>12</td>
<td>11/7</td>
<td>Student presentation/ Journal club Disease mapping</td>
<td>Students</td>
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<tr>
<td>13</td>
<td>11/14</td>
<td>Student presentation/ Journal club Consumer genomics</td>
<td>Students</td>
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<tr>
<td>14</td>
<td>11/21</td>
<td>No Class/Thanksgiving Holiday</td>
<td></td>
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<tr>
<td>15</td>
<td>11/28</td>
<td>Student presentation/ Journal club Implication of genetic inferences or TBD</td>
<td>Students</td>
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</table>

**Grading:**
- Homework Assignments: 40%
- Student Presentations: 40%
- Participation: 20%

**Instructor Contact Information:**

**Professor:** Priya Moorjani  
Office Location: 308C Stanley Hall  
e-mail: moorjani@berkeley.edu

**Professor:** Dan Rokhsar  
Office Location: 541A LSA  
e-mail: drokhsar@berkeley.edu

**Graduate Student Instructor:** Sandra Hui  
e-mail: sandra_hui@berkeley.edu

**Attendance:** Attendance (sign-in) is taken each week. If you are going to miss a class you are encouraged to contact the instructors ahead of time. Attendance each week of the semester is critical to success in the course. **If you miss more than two classes, you will be dropped from the course.**

**Lecture Slides and Course Reading Assignments:** Slides will be posted on bCourses after each class. All Reading Assignments will be posted on bCourses. Don’t get behind on reading! Reading is required ahead of the assigned class.

**Homework Assignments:** These will be posted on bCourses and are due before class begins on dates listed in syllabus. Assignments should be submitted via the bCourses site as pdf or word document submission through bCourses. Last name must be included in file name as
shown: (LASTNAME_COMPBIO293_Homework1_2018.pdf). In addition, First and Last name should be included at the top of the document. There will be a place for you to insert this information in each homework assignment.

**Location:** 321 Stanley Hall

**Recommended Textbook:** For reference, please use the following two textbooks:
1. Human Evolutionary Genetics (second edition) by Jobling, Hurles, and Tyler-Smith;

**Attendance:** Attendance (sign-in) is taken each week. If you are going to miss a class you are encouraged to contact the instructors ahead of time. Attendance each week of the semester is critical to success in the course. **If you miss more than two classes, you will be dropped from the course.**

**Mental Health:**

If you are experiencing stress, anxiety, or other forms of distress during the semester, we hope to be a resource for you. Please reach out to the GSI or Professor if you need support. There are also many resources available to you. All registered Berkeley students are eligible to use Counseling Psychological Services. You do not have to purchase the Student Health Insurance Plan to use these services. The first five counseling sessions are free for registered Berkeley students. Counselors can provide support in academic success, life management, career and life planning, and personal growth and development.

**UC Berkeley, Counseling Psychological Services:**

- Please call (510) 642-9494 or stop by the office on the 3rd floor of the Tang Center to make an appointment with a counselor.
- Drop-in counseling for emergencies: Monday - Friday, 10:00AM - 4:30PM
- After hours counseling: In the case of emergencies at night or on weekends, call (855) 817-5667 for free assistance and referrals. Request to speak with a counselor.
- For emergency support: Call UCPD 911 or (510) 642-3333

**24 Hour Crisis Hotlines:**

- Alameda County Crisis Line: (offers confidentiality, TDD services for deaf and hearing impaired callers and translation in 140 languages) Call 1-800-309-2131
- National Crisis Help Line: Call 1-800-273-TALK
- National HopeLine Network: Call 1-800-SUICIDE

We also ask that you look out for your fellow peers. If you see any of the signs below that may indicate your classmate may need assistance, please use the resources above or reach out to the GSI or Professors.

- Withdrawing from other people
- Changes in weight or eating patterns
- Changes in sleeping patterns
- Fatigue or lack of energy
● Increased anxiety or irritability
● Feeling worthless or hopeless

**Academic Dishonesty:**

Academic dishonesty is not acceptable at UC Berkeley. Academic dishonesty is any action that may result in creating an unfair academic advantage for oneself or unfair academic disadvantage for another member of the academic community. Therefore, any exam, quiz, paper, and/or homework assignment submitted by you that bears your name should be your own original work. In all of your assignments, including your homework or drafts of papers, you may use words or ideas written by other individuals in publications, web sites, or other sources, but only with proper attribution. 'Proper attribution' means that you have fully identified the original source and extent of your use of the words or ideas of others that you reproduce in your work for this course, usually in the form of a footnote, parentheses or quotations. If you are not clear about the expectations for completing an assignment or taking a test or examination, be sure to seek clarification from the instructors or GSI beforehand. Cheating and plagiarism are forms of academic dishonesty and are NOT TOLERATED under any circumstance. Any evidence of academic dishonesty will result in a score of zero (0) on that assignment or exam, and will be reported as soon as possible to the Center for Student Conduct (http://sa.berkeley.edu/conduct). This will result in a permanent scar on your academic record. In 2015, UC Berkeley launched the Turnitin service (https://asuc.org/honorcode/index.php) to support academic integrity and the campus honor code. Turnitin is an opt-in tool enabled through bCourses that allows Instructors and GSIs to check student assignments for originality. We will use Turnitin in this course for all written assignments. The consequences of cheating and academic dishonesty are substantial, including a formal discipline file, possible loss of future internship, scholarship, or employment opportunities, and denial of admission to graduate or medical school.
Reading List for Fall Semester 2018 (Tentative):

**Week 1**  
**Date 8/22**  
Concepts in Population Genetics (Dan)  
Readings:  

**Week 2**  
**Date 8/29**  
Archaic genomes: Neanderthals and Denisova (Priya)  
Readings:  

**Week 3**  
**Date 9/5**  
Concepts in Population Genetics 2 (Dan)  
Readings:  

**Week 4**  
**Date 9/12**  
Making inferences about human history and evolution from genetic data  
Readings:  

**Week 5**  
**Date 9/19**  
Origin of Modern Humans and Out of Africa Migration  
Readings:  

**Week 6**  
**Date 9/26**  
Human-Neanderthals: species or populations?  
Readings:  
1. The complete genome sequence of a Neanderthal from the Altai Mountains  
   https://www.nature.com/articles/nature12886  

**Week 7**
**Date 10/3**
**Genetic uniqueness of humans**

Readings:

**Week 8**
**Date 10/10**
**Recent human prehistory: Migrations, replacements and mixtures**

Readings:

**Week 9**
**Date 10/17**
**no class (ASHG)**

**Week 10**
**Date 10/24**
**Human Adaptation and Selection**

Readings:

**Week 11**
**Date 10/31**
**Disease mapping**

Readings:

**Week 12**
**Date 11/7**
**Polygenic risk estimation**

Readings:

**Week 13**  **Date 11/14**  **Personal genomics**
**Readings:**

**Week 14**  **Date 11/21**  **No Class/Thanksgiving Holiday**

**Week 15**  **Date 11/28**  **Implication of genetic inferences on Personal genomics**
**Ideas:**

**Exercise**
*4 questions each week (2 per paper)*