CAMB713: Neuroepigenetics

TIME: Thursdays 1:45-3:45
9/2 - 12/9

LOCATION: Stellar Chance 204

COURSE DIRECTORS:
- Zhaolan (Joe) Zhou 215.746.5025  zhaolan@pennmedicine.upenn.edu
- Elizabeth Heller 215.573.7038  eheller@pennmedicine.upenn.edu
- Hao Wu 215.573.9360  haowu2@pennmedicine.upenn.edu

GOALS: This is a course intended to bring students up to date concerning our understanding of neuroepigenetics. It is based on assigned topics and readings covering a variety of experimental systems and concepts in the field, formal presentations by individual students, critical evaluation of primary data, and in-depth discussion of potential issues and future directions.

The goals of each seminar-style session are:
1) Review basic concepts of epigenetics in the context of neuroscience
2) Learn to critically evaluate a topic (not a single paper) and rigor of prior research
3) Improve experimental design and enhance rigor and reproducibility
4) Catch up with the most recent development in neuroepigenetics
5) Develop professional presentation skills - be a storyteller

FORMAT: Each week will focus on a specific topic of Neuroepigenetics via a “seminar” style presentation by a class member with the following expectations:

Consultation with preceptor prior to presentation

Oral Presentation with Slides
Introduction (~10 min): Context of topic in the field
                    Historic perspectives of the topic
                    Current understandings

Primary data (~30 min): Questions of interest
                        Design of experiments
                        Interpretation of data

Discussion (~20 min): Issues/challenges
                       Proposed future experiments
                       Future directions in a big picture

Engage class for discussion and participation, and manage the presentation in 2 hours

One or more course directors and a guest preceptor will be present each week to facilitate discussions

EVALUATION:
1) Knowledge of assigned paper and broadly relevant background/developments
2) Consultation with faculty preceptor
3) Peer evaluation and faculty evaluation
4) Enforcement – grading policy: **50% class participation**
   **50% presentation**

COURSE UNIT VALUE: 1 unit
ENROLLMENT LIMITS: 15 (maximum)
PREREQUISITES: BIOM555 or permission by course director
<table>
<thead>
<tr>
<th>Date</th>
<th>Directors (Min. 2)</th>
<th>Preceptor</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/2</td>
<td>Joe, Liz, Hao</td>
<td>Course Directors - Joe/Hao/Liz</td>
<td>Organizational Meeting</td>
</tr>
<tr>
<td>9/9</td>
<td>Joe, Liz, Hao</td>
<td>Course Directors - Joe</td>
<td>The essence of neuroepigenetics: DNA modification and related methods</td>
</tr>
<tr>
<td>9/16</td>
<td>Joe, Hao</td>
<td>Course Directors - Hao</td>
<td>3D genome/long non-coding RNA/Phase separation and related methods</td>
</tr>
<tr>
<td>9/23</td>
<td>Liz, Hao</td>
<td>Jennifer Cremins</td>
<td>3D genome and heterochromatin misfolding in fragile X</td>
</tr>
<tr>
<td>9/30</td>
<td>Liz, Joe</td>
<td>Erica Korb</td>
<td>Histone variants in neurodevelopmental disorders</td>
</tr>
<tr>
<td>10/7</td>
<td>Hao, Joe</td>
<td>Marisa Bartolomei</td>
<td>Imprinting in the brain and imprinting disorders</td>
</tr>
<tr>
<td>10/14</td>
<td>Liz, Joe</td>
<td>Colin Conine</td>
<td>Epigenetic inheritance and miRNAs</td>
</tr>
<tr>
<td>10/21</td>
<td>Joe, Hao</td>
<td>Richard Phillips</td>
<td>Epigenetic mechanisms driving central nervous system tumors</td>
</tr>
<tr>
<td>10/28</td>
<td>Liz, Joe</td>
<td>Joe Zhou</td>
<td>Epigenetic mechanisms underlying stress-related major depressive disorder</td>
</tr>
<tr>
<td>11/4</td>
<td>Liz, Joe</td>
<td>Naiara Akizu</td>
<td>Epigenetic mechanisms of neural development and diseases</td>
</tr>
<tr>
<td>11/11</td>
<td>Joe, Hao, Liz</td>
<td>Hongjun Song</td>
<td>Epitranscriptomics</td>
</tr>
<tr>
<td>11/18</td>
<td>Joe, Hao, Liz</td>
<td>Shelley Berger</td>
<td>TBD</td>
</tr>
<tr>
<td>11/25</td>
<td>Thanksgiving</td>
<td>No class</td>
<td></td>
</tr>
<tr>
<td>12/2</td>
<td>Joe, Hao, Liz</td>
<td>Liz</td>
<td>Chromatin regulation of alternative splicing</td>
</tr>
<tr>
<td>12/9</td>
<td>Joe, Hao</td>
<td>Hao</td>
<td>Single-cell Genomics (transcriptome/epigenome) in Neuroscience</td>
</tr>
</tbody>
</table>

Additional information on class Google sheet:
https://docs.google.com/spreadsheets/d/1JkEbBcq-ASZS_9sh1j4dZ8rbKaS2Ff3SHsIoMp3H-fU/edit?usp=sharing