CAMB/NGG 713: Neuroepigenetics

TIME: Thursdays 1:45-3:45
9/8 - 12/8/2022

LOCATION: CRB 302

COURSE DIRECTORS:
- Zhaolan (Joe) Zhou 215.746.5025 zhaolan@pennmedicine.upenn.edu
- Erica Korb 215.605.9759 ekrorb@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 1.5 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</th>
<th>Preceptor</th>
<th>Topic</th>
<th>Papers (PubMed ID or Preprint link)</th>
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</thead>
<tbody>
<tr>
<td>8-Sep</td>
<td>Joe, Hao</td>
<td>Course Directors</td>
<td>Organization meeting and lecture by course directors</td>
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<tr>
<td>15-Sep</td>
<td>Erica, Hao</td>
<td>Course Directors</td>
<td>Lectures by course directors</td>
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<tr>
<td>22-Sep</td>
<td>Erica, Joe</td>
<td>Hongjun Song</td>
<td>Epitranscriptomic regulation of neurogenesis</td>
<td>PMID: 28965759</td>
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<td>29-Sep</td>
<td>Erica, Hao</td>
<td>Shelley Berger</td>
<td>Metabolic-Epigenetic axis in learning and memory</td>
<td>PMID: 35921439; Background PMID: 28562591</td>
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<tr>
<td>6-Oct</td>
<td>Hao, Joe</td>
<td>Naiara Akizu</td>
<td>Epigenetic basis of neurodevelopmental disorders</td>
<td>PMID:34637754</td>
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<tr>
<td>13-Oct</td>
<td>Joe, Hao</td>
<td>Marisa Bartolomei</td>
<td>Genomic Imprinting in Brain</td>
<td>PMID: 32707083</td>
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<td>20-Oct</td>
<td>Erica, Joe</td>
<td>Liz Heller</td>
<td>Chromatin mediated alternative splicing in brain</td>
<td>PMID: 34480866; Comment PMID: 34534452</td>
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<td>27-Oct</td>
<td>Hao, Erica</td>
<td>Colin Conine</td>
<td>Epigenetic Inheritance and miRNAs</td>
<td>PMID: 33568480</td>
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<td>3-Nov</td>
<td>Hao, Joe</td>
<td>Yijing Su</td>
<td>Neuronal activity induced chromatin accessibility changes</td>
<td>PMID:28166220</td>
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<tr>
<td>10-Nov</td>
<td>Joe, Hao</td>
<td>Zhaolan (Joe) Zhou</td>
<td>Epigenetic basis of stress related major depression</td>
<td>PMID: 35013139</td>
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<td>17-Nov</td>
<td>Erica, Hao</td>
<td>Erica Korb</td>
<td>Histone variants in neurodevelopmental disorders</td>
<td>PMID: 31491386</td>
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<td>24-Nov</td>
<td>Thanksgiving</td>
<td>No class</td>
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<td>1-Dec</td>
<td>Joe, Erica</td>
<td>Kavitha Sarma</td>
<td>Non-canonical chromatin structures in neurodifferentiation</td>
<td>PMID: 35013239</td>
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<td>8-Dec</td>
<td>Hao, Erica</td>
<td>Hao Wu</td>
<td>Chromatin and gene-regulatory dynamics of the developing brain</td>
<td>PMID: 34390642; Background PMID: TBA</td>
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