CAMB713: Neuroepigenetics

TIME: Thursdays 1-3pm 9/3 – 12/10 (organizational meeting 9/3, no class on 11/26)

LOCATION: Zoom (virtual)
https://pennmedicine.zoom.us/j/97654240270
Passcode: 039745

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 Neural Epigenetics. It is based on assigned topics and readings covering a variety of experimental systems and concepts in the field of Neuroepigenetics, formal presentations by individual students, critical evaluation of primary data, and in-depth discussion of potential issues and future directions, with goals to:

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 story teller

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
Introduction (~20 min): Context of topic in the field
Historic perspectives of the topic
Current understandings
Primary data (~40 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) Read assigned paper and relevant background/developments broadly
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 directors
List of Topics of Interest

The molecular basis of epigenetics (An overview by course directors)
Cutting-edge technologies in studying neuroepigenetics
Neurogenesis and adult neurogenesis
Neuronal differentiation and cellular diversity
Synaptogenesis and synaptic plasticity
Neuronal activity-dependent gene regulation
Epigenetic mechanisms in learning and memory
Epigenetic mechanisms in the context of neurodevelopmental disorders
Epigenetic mechanisms in the context of neuropsychiatric disorders
Epigenetic mechanisms in the context of aging and neurodegeneration
Imprinting in the central nervous system
Transgenerational inheritance in the context of stress
Transgenerational inheritance in the context of addiction

List of Faculty Preceptors (*course directors)

Marisa Bartolomei  Cell and Dev. Biology  9-123 Smilow  215.898.9063  bartolom@pennmedicine.upenn.edu
Naiara Aquizu Lopez  5052 Colket Translational Research Building  215.590.2232  aquizun@email.chop.edu
Felice Elephant  Drexel  215.895.0220  fe22@drexel.edu
Peter Hamilton  VCU  804.628.3003  peter.hamilton@vcuhealth.org
*Liz Heller  Pharmacology  10-115 Smilow  215.573.7038  eheller@pennmedicine.upenn.edu
Erica Korb  Genetics  9-133 Smilow  215.573.5705  ekorb@pennmedicine.upenn.edu
Ian Maze  Mount Sinai  212.824.8979  ian.maze@mssm.edu
Hongjun Song  Neuroscience  105 CRB  215.573.2449  shongjun@pennmedicine.upenn.edu
*Hao Wu  Genetics  527 CRB  215.573.9360  haowu2@pennmedicine.upenn.edu
*Zhaolan (Joe) Zhou  Genetics  452A CRB  215.746.5025  zhaolan@pennmedicine.upenn.edu
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<thead>
<tr>
<th>Date</th>
<th>Presenter/Student</th>
<th>Preceptor</th>
<th>Topic</th>
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<tr>
<td>9/3</td>
<td>Organization meeting</td>
<td>Course Directors (Joe/Hao/Liz)</td>
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<tr>
<td>9/10</td>
<td>Lecture 1</td>
<td>Course Directors (Joe)</td>
<td>The essence of neuroepigenetics: DNA modification</td>
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<td>9/17</td>
<td>Lecture 2</td>
<td>Course Directors (Liz)</td>
<td>The essence of neuroepigenetics: Histone modification</td>
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<td>9/24</td>
<td>Ryan Schwark</td>
<td>Course Directors (Hao)</td>
<td>MECP2 &amp; neurodevelopmental disease</td>
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<tr>
<td>10/1</td>
<td>Katie Titus</td>
<td>Erica Korb</td>
<td>Histone variants in the brain</td>
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<td>10/8</td>
<td>Marissa Maroni</td>
<td>Felice Elephant</td>
<td>Neuroepigenetics of AD in drosophila</td>
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<td>10/15</td>
<td>Adrienne Jo</td>
<td>Naiara Aquizu Lopez</td>
<td>Neurodevelopmental disorders of histone lysine methylases</td>
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<td>10/22</td>
<td>Katie Copley</td>
<td>Course Directors (Liz)</td>
<td>Epigenetics of addiction</td>
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<td>10/29</td>
<td>Amanda Weiss</td>
<td>Ian Maze</td>
<td>Monoaminylation in brain</td>
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<td>11/5</td>
<td>Elizabeth Mercado Ayon</td>
<td>Course Directors (Joe)</td>
<td>Epigenetic mechanisms underlying the effect of stress</td>
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<td>11/12</td>
<td>Sarah Gagnon</td>
<td>Hongjun Song</td>
<td>Epi-transcriptomics in neural development</td>
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<td>11/19</td>
<td>Rae Herman</td>
<td>Peter Hamilton</td>
<td>Transcriptional regulation in Brain</td>
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<td>12/3</td>
<td>Vanessa Sanchez</td>
<td>Marisa Bartolomei</td>
<td>Genomic imprinting in brain</td>
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<td>12/10</td>
<td>Sophia Villiere</td>
<td>Course Directors (Hao)</td>
<td>Single-cell multi-omics in mammalian motor cortex</td>
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