GCB/CAMB 752 – Seminar in Genomics
Spring 2022: Thursday 3:30-6:30pm
BRB II/III Room 252

COURSE DIRECTORS:
Kara Maxwell, MD, PhD
BRB 810
kara.maxwell@pennmedicine.upenn.edu

Ingo Helbig, MD
Roberts Building 15361 (15th Floor)
HELBIGI@chop.edu

COURSE GOALS: There are several goals for this course. One is to provide exposure to seminal and current 'omics approaches and applications (including genomics, epigenomics, transcriptomics and proteomics). A second goal is to provide a forum to further develop students' critical thinking skills through literature review and class discussions. A third goal is to develop the skills necessary to search the literature on a given topic and provide a clear and concise review of the research area, an essential step toward identifying gaps in knowledge that may serve as foundations for new research ideas and grant proposals. These goals will be achieved through instructor presentations, readings, class discussions, and a writing assignment. Prerequisite: GCB 531/534 Intro to Genomics or equivalent, or permission of instructor.

COURSE DESCRIPTION: The class will meet once a week for a 2-hour period. Each class will involve a faculty member providing an introduction from an experimental and/or computational standpoint of the literature that assumes basic knowledge of the subject. There are two course directors and at least one of them will attend every session. During each class, a faculty member will provide an introduction lasting either 30 minutes followed by a discussion of one research paper provided by the lecturer. One student will be responsible for presenting an overview of the paper and answering a discussion question assigned by the faculty member regarding the paper they present. All students not presenting are required to post a question or comment on the paper in Canvas under "Discussions". Each presenter will have 30-40 minutes to present their assigned paper and answer the instructor-assigned question to the whole class. Additional time will be utilized to address questions and comments posted by the class.

READING ASSIGNMENTS: At least one week prior to their session, the lecturer will assign 1 primary research papers. The lecturer may also elect to provide a review article that provides relevant background. The lecturer will also assign a discussion question on the paper to guide student reading, critical thinking, and discussion. Students are responsible for reading these materials before each session. Each student is also required to post on CANVAS a question that they would like student leaders or faculty lecturers to answer during the paper discussions.

WRITING ASSIGNMENT: There will be one major writing assignment in the format of a Review Article or News and Views. Early in the course, students will propose a topic and set of recent papers on a particular area of genomics. They will be asked to write a review article synthesizing the key ideas in the papers and explaining their significance. Proposed topics/papers will be due on February 10th. Proposed topics will be reviewed and approved by the course directors. Additional details will be provided in class. NOTE: It is highly recommended that BGS students preparing for the preliminary exam utilize this as an opportunity to review the literature pertinent to their exam proposal topic.

CANVAS: The course directors will post assigned papers, and questions provided by specific faculty instructors at least one week prior to each class. The students are required to post their questions for each assigned paper by 5 pm the day before the breakout session.

COURSE GRADE: The course grade will be based on: 50% writing assignment, 20% paper presentation, and 30% on participation as judged by submitting questions on CANVAS.

SYLLABUS (First week is lecture only, paper discussions start Week 2):

Week	Date	Topic	Instructor
1	Jan 13	Genomics/Genetics: Lecture & Journal Club How-to	Ingo Helbig
2	Jan 20	Genomics/Genetics *JC Begins	Ingo Helbig
3	Jan 27	Transcriptomics and Single Cell RNA Sequencing	Yoseph Barash Pablo Gonzalez-Camara
4	Feb 3	Epigenomics	Wanding Zhou
5	Feb 10	Spatial and Functional Genomics *Writing Topic Proposals Due*	Allesandra Chesi
6	Feb 17	Single Cell 'Omics	Derek Oldridge
7	Feb 24	Proteomics	Cesar de la Fuente
8	Mar 3	Microbiome	Rick Bushman
9	**Mar 11**	**No Class: Spring Break**	
10	Mar 17	Use of 'Omics in Model Organisms	John Murray
11	Mar 24	Cancer Genomics	Kara Maxwell
12	Mar 31	Machine Learning / AI / Phenomics	Danielle Mowery
13	Apr 7	Pharmacogenetics * Writing assignment due	Marylyn Ritchie
14	Apr 14	Neurodevelopmental Disorder Genomics and Models	Maja Bucan Tom Jongens
15	Apr 21	Multi-omic approaches to studying kidney disease	Katalin Susztak