CAMB 511: PRINCIPLES OF DEVELOPMENT **Winter/Spring 2020**

Date	Topic	Lecturer
1/15	Organizational Meeting	Patrick Seale
1/16	Cell lineage and fate maps; Introduction to genetics	Mary Mullins
1/21	No Class	
1/23	Body plan formation: Gastrulation, germ layer formation and morphogenesis	Peter Klein
1/24	Discussion-1	PS
1/28	Induction of the primary germ layers	Dan Kessler
1/30	Single cell tracking and cell specification events	John Murray
1/31	Discussion-2	PS
2/4	Establishing neuronal identity: Cilia and Shh signaling	Doug Epstein
2/6	Left-right patterning	Dan Kessler
2/7	Discussion-3	DE
2/11	Morphogens in patterning	Mary Mullins
2/13	Creating periodic patterns	Shawn Little
2/14	Discussion-4	PS
2/18	Tubulogenesis: insights from C. elegans	Meera Sundaram
2/20	Notch signaling/lateral inhibition	Meera Sundaram
2/21	Discussion-5	PS
2/25	Cell polarity and asymmetric cell divisions	Eric Witze
2/27	Vascular development and angiogenesis	Arndt Siekmann
2/28	Discussion-6	PS
3/3	Lung development and branching	David Frank
3/5	Kidney development, maintenance and disease modeling	Katalin Susztak
3/6	Discussion-7	TBD
3/7 - 3/15	*Spring Break*	

3/17	Scaling in development	Matt Good
3/19	Introduction and history of stem cell field	John Gearhart
3/20	Discussion-8	PS
3/24	Adipose tissue development	Patrick Seale
3/26	Principles of stem cells in development	Chris Lengner
3/27	Discussion-9	PS
3/31	Cytoskeleton, cell shape and embryogenesis	Nicolas Plachta
4/2	X chromosome inactivation in development and disease	Monserrat Anguera
4/3	Discussion-10	TBD
4/7	Lineage reprogramming in development	Ken Zaret
4/9	Hematopoietic stem cell formation and renewal	Nancy Speck
4/10	Discussion-11	TBD
4/14	piRNA regulation in the germ line	Jeremy Wang
4/16	Stem cell niches in development	Steve DiNardo
4/17	Discussion-12 (Send out Final Exam)	PS
4/21	Mechanosensing in cell fate and differentiation	Alex Hughes
4/23	Evo-Devo	Steve DiNardo
4/24	Discussion-13	PS
4/28	Imaging stem cell dynamics	Pantelis Rompolas
4/30	Regeneration	Faye Mourkioti
5/1	Discussion-14	PS
5/5	Metabolic regulation of development	Patrick Seale
5/7	Discussion-15 & Course wrap up	
5/8	**Final Exam Due**	

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Class Schedule:
Lectures-1:30-3:00 on Tuesday and Thursday in Room 1201 BRB II/III
Discussions-Friday 1:30-2:30, in Room 1201 BRB II/III

Recommended Text:
Developmental Biology (now in 11th edition) by Scott F. Gilbert (Used on Amazon for ~$20)

Discussions:
Each week one research article will be assigned for mandatory reading. One student each week will present background material for the article to the rest of the class and lead the discussion. All students will be involved in reviewing and discussing the articles at each meeting.

Exams:
The midterm and final exams will be take-home written exams in essay format.

Grading:
Grades will be based on: the discussion presentation (30%); participation in the discussion sessions (asking questions, commentary) and attendance (30%); and the final exam (40%).

Course Website:
A course website is available at the Penn CANVAS site. The website includes the course schedule, syllabus, faculty contact information and discussion papers for download. In addition, course lectures will be posted as Powerpoint files for each lecture.