

<b><u>Date</u></b>	<b><u>Topic</u></b>	<b><u>Lecturer</u></b>
1/15	Organizational Meeting	Patrick Seale
1/19	Cell lineage and fate maps; Introduction to genetics	Mary Mullins
1/21	Body plan formation: Gastrulation, germ layer formation and morphogenesis	Peter Klein
1/22	Discussion-1	
1/26	Induction of the primary germ layers	Dan Kessler
1/28	Morphogens in patterning	Mary Mullins
1/29	Discussion-2	
2/2	Establishment of the AP and DV axes in Drosophila	Shawn Little
2/4	Creating periodic patterns	Shawn Little
2/5	Discussion-3	
2/9	Left-right patterning	Dan Kessler
2/11	Establishing neuronal identity: Cilia and Shh signaling	Doug Epstein
2/12	Discussion-4	
2/16	Notch signaling/lateral inhibition	Meera Sundaram
2/18	Tubulogenesis: insights from C. elegans	Meera Sundaram
2/19	Discussion-5	
2/23	Scaling in development	Matt Good
2/25	Cytoskeleton, cell shape and embryogenesis	Nicolas Plachta
2/26	Discussion-6	
3/2	Single cell tracking and cell specification events	John Murray
3/4	Vascular development and angiogenesis	Arndt Siekmann
3/5	Discussion-7	
3/9 - 3/12	<i>Spring Break</i>	

3/16	Principles of stem cells in development	Chris Lengner
3/18	Stem cell niches in development	Steve DiNardo
3/19	Discussion-8 <b>(Send out take-home Exam)</b>	
3/23	Lung development and branching	TBD
3/25	Kidney development, maintenance, and disease modeling	Katalin Susztak
3/26	No Discussion <b>(Exam due)</b>	
3/30	Skin development and homeostasis	Yana Kamberov
4/1	Metabolic regulation of development	Patrick Seale
4/2	Discussion-9	
4/6	Adipose tissue development	Patrick Seale
4/8	Hematopoietic stem cell formation and renewal	Nancy Speck
4/9	Discussion-10	
4/13	TBD	TBD
4/15	X chromosome inactivation in development and disease	Montserrat Anguera
4/16	Discussion-11	
4/20	Skeletal development and mechanical cues	Joel Boerckel
4/22	Mechanosensing in cell fate and differentiation	Alex Hughes
4/23	Discussion-12	
4/27	Imaging stem cell dynamics	Pantelis Rempoulas
4/29	Regeneration	Faye Mourkioti
4/30	Discussion-13 <b>(N&amp;V articles due)</b>	
5/4	Evo-Devo	Steve DiNardo
5/6	Discussion-14 & Course wrap-up	

**Course director:**

Patrick Seale  
Dept. of Cell and Developmental Biology  
Institute for Diabetes, Obesity and Metabolism  
12-105 Smilow Center for Translational Research (12<sup>th</sup> Floor)  
215-573-8856  
sealep@penndicine.upenn.edu

**Course faculty:**

Montserrat Anguera, [anguera@vet.upenn.edu](mailto:anguera@vet.upenn.edu)  
Joel Boerckel, [boerckel@penndicine.upenn.edu](mailto:boerckel@penndicine.upenn.edu)  
Steve DiNardo, [sdinardo@penndicine.upenn.edu](mailto:sdinardo@penndicine.upenn.edu)  
Doug Epstein, [epsteind@penndicine.upenn.edu](mailto:epsteind@penndicine.upenn.edu)  
Matt Good, [mattgood@penndicine.upenn.edu](mailto:mattgood@penndicine.upenn.edu)  
Alex Hughes, [ajhughes@seas.upenn.edu](mailto:ajhughes@seas.upenn.edu)  
Yana Kamberov, [yana2@penndicine.upenn.edu](mailto:yana2@penndicine.upenn.edu)  
Dan Kessler, [kesslerd@penndicine.upenn.edu](mailto:kesslerd@penndicine.upenn.edu)  
Peter Klein, [pklein@penndicine.upenn.edu](mailto:pklein@penndicine.upenn.edu)  
Chris Lengner, [Lengner@vet.upenn.edu](mailto:Lengner@vet.upenn.edu)  
Shawn Little, [shlittle@penndicine.upenn.edu](mailto:shlittle@penndicine.upenn.edu)  
Faye Mourkioti, [fmour@penndicine.upenn.edu](mailto:fmour@penndicine.upenn.edu)  
Mary Mullins, [mullins@penndicine.upenn.edu](mailto:mullins@penndicine.upenn.edu)  
John Murray, [jmurr@penndicine.upenn.edu](mailto:jmurr@penndicine.upenn.edu)  
Nicolas Plachta, [nicolas.plachta@penndicine.upenn.edu](mailto:nicolas.plachta@penndicine.upenn.edu)  
Pantelis Rompolas, [rompolas@penndicine.upenn.edu](mailto:rompolas@penndicine.upenn.edu)  
Arndt Siekmann, [arndt.siekmann@penndicine.upenn.edu](mailto:arndt.siekmann@penndicine.upenn.edu)  
Nancy Speck, [nancyas@upenn.edu](mailto:nancyas@upenn.edu)  
Meera Sundaram, [sundaram@penndicine.upenn.edu](mailto:sundaram@penndicine.upenn.edu)  
Katalin Susztak, [ksusztak@penndicine.upenn.edu](mailto:ksusztak@penndicine.upenn.edu)

**Class Schedule:**

Lectures-1:30-3:00 on Tuesday and Thursday (BlueJeans)

Discussions-Friday 1:30-2:30 (BlueJeans)

**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.

**Discussion Boards:**

A discussion board will be available on Canvas for each assigned paper (active for one-week Fri-Fri). Non-presenting students should post at least one comment per paper. You can choose a figure from the paper to explain in your own words, comment on the significance of a particular result, raise questions about a method, etc.

**News & Views Paper:**

Choose a recent (2020-) research article on a topic covered in class to write a “News & Views” piece (choose a paper that does not already have an accompanying preview and have it approved). Your piece should put the article in the context of its field, highlighting the research advance, and should not simply be a summary of the paper. It is a viewpoint, so personal opinions can be included, including your view of potential deficiencies and advances of the article. (<1000 words, can include a summary figure)

**Grading:**

1. Discussion presentation (25)
2. Participation and attendance (25)
  - Discussion boards in Canvas
  - Participation during lectures and discussions (engagement in class, asking questions, contributing to discussions)
3. Take home exam (25)
4. News and Views article (25)

**Course Website:**

Our class site on Canvas ([canvas.upenn.edu](https://canvas.upenn.edu)) includes the course schedule, syllabus, faculty contact information, discussion papers for download, discussion board.