

Module 1: Microscopy, Echinoderms, Tunicates and Other Basal Deuterostomes (June 2- June 9)		
6/2/24 (Sun)	Reception & Dinner, 7pm 2 nd Floor Loeb (Rm #256)	Tatjana Piotrowski , (Stowers); Athula Wikramanayake , (Univ. Miami), <i>Welcome and Course overview. Bring your posters</i>
6/3/24 (Mon)	Morning lecture	Tatjana Piotrowski , (Stowers Institute) and Athula Wikramanayake , (Univ. Miami), <i>Intro to Embryology Course and Developmental Biology and metazoan body plans</i>
	Afternoon lab (1PM)	<i>Marine Resource Center tour and tour of Loeb. (1-3PM)</i> Jon Henry , (MBL), Zak Swartz (MBL), Margherita Perillo (MBL), Athula Wikramanayake (UMiami), <i>Tool making & microinjection (use echinoderms to practice microinjections) (3-6PM)</i>
	Evening lab (7:30PM)	<i>Continue tool making & microinjection</i>
6/4/24 (Tue)	Morning lecture	Lisa Cameron , (Duke U.), Michelle Itano , (UNC Chapel Hill), Paula Montero Llopis (Harvard), <i>Light and confocal microscopy</i>
	Afternoon lab (1pm)	Lisa Cameron , (Duke U.), Michelle Itano , (UNC Chapel Hill), Paula Montero Llopis (Harvard), <i>Light and confocal microscopy</i>
	Evening lab (7:30pm)	Lisa Cameron , (Duke U.), Michelle Itano , (UNC Chapel Hill), Paula Montero Llopis (Harvard), <i>Light and confocal microscopy</i>
6/5/24 (Wed)	Morning lecture	Athula Wikramanayake , (Univ. Miami), <i>Introduction to echinoderms and early patterning</i> Veronica Hinman , (Carnegie Mellon), <i>Gene regulatory network analysis and GRN evolution</i>
	Afternoon & evening labs	<i>Echinoderms</i>
6/6/24 (Thu)	Morning lecture	Zak Swartz , (MBL), <i>Lessons from sea stars: reproduction and early development in a changing ocean</i> , Margherita Perillo , (MBL), <i>Sea stars and sea cucumbers as models for organogenesis</i>
	1pm- 1:30pm	HCR technology seminar fish bowl
	Afternoon & evening labs	<i>Echinoderms</i>
	Dinner/Discussion at Swope	Athula Wikramanayake , (Univ. Miami) and Tatjana Piotrowski , (Stowers Institute), <i>Ethics Discussion- authorship and navigating mentor/mentee relationships</i>
6/7/24 (Fri)	Morning lecture	Bob Zeller , (San Diego State Univ.), <i>Introduction to ascidian development - sea squirts made easy</i> ; Ed Munro , (Univ. Chicago), <i>Dynamics of morphogenesis in ascidians</i>
	Afternoon & evening labs	<i>Ascidians (echinoderms)</i>
6/08/24 (Sat)	Morning lecture	Lionel Christiaen (Sars Centre, Norway, NYU). <i>Regulation of multipotency and cell fate choices in the cardiopharyngeal lineage of Ciona</i>
	Afternoon & evening labs	<i>Echinoderms and ascidians</i>
6/09/24 (Sun)	7:00pm	<i>Scavenger hunt and course dinner</i>
<i>Things to do this week: T-shirt design for class, softball t-shirt, parade committee</i>		
Module 2: Nematodes, Tardigrades, Planaria, Acoels (June 10-15)		
6/10/24 (Mon)	Morning lecture (9-11am)	Dave Sherwood , (Duke), <i>C. elegans introduction & cell-matrix interactions</i>
	Afternoon & evening labs	<i>C. elegans</i>
6/11/24 (Tue)	Morning lectures	Dan Dickinson (UT Austin), <i>Establishing cell polarity</i> Geraldine Seydoux , (Johns Hopkins/ HHMI), <i>C. elegans early development</i>
	1:30pm library tour	Half of class
	Afternoon lab	<i>C. elegans</i>
6/12/24 (Wed)	Morning lecture	Bob Goldstein , (UNC Chapel Hill), <i>Tardigrades. Meryl Rose lecture.</i>
	Afternoon & evening labs	<i>Tardigrades (C. elegans)</i>
6/13/24 (Thu)	Morning lecture	Alejandro Sanchez Alvarado , (Stowers Inst.), <i>Planaria & regeneration</i>
	Afternoon & evening lab	<i>Planaria (C. elegans, tardigrades)</i>
6/14/24 (Fri)	Morning lecture	Mansi Srivastava , (Harvard), <i>Acoel development & regeneration</i>
	Afternoon & evening labs,	<i>Acoels (C. elegans, planaria, tardigrades)</i>
6/15/24 (Sat)	Morning concepts disc.	Athula Wikramanayake , (Univ. Miami) and Tatjana Piotrowski , (Stowers Institute)
	Afternoon & evening labs	<i>C. elegans, acoels, planaria, tardigrades</i>
	Class presentations (9pm)	<i>Show 'n Tell 1; lab clean up</i>
6/16/24 (Sun)	<i>Free time</i>	
Module 3: Arthropods & Spiralians (June 17-22)		
6/17/24 (Mon)	Morning lecture	Nipam Patel , (Univ. Chicago/MBL), <i>Drosophila embryogenesis</i> ; Melanie Worley , (UVA) <i>postembryonic development.</i>
	Afternoon & evening labs	<i>Arthropods</i>
6/18/24	Morning lecture	Nipam Patel , (Univ. Chicago/MBL), <i>Evo-devo arthropod body plans, Parhyale</i> ;

(Tue)		Melanie Worley , (UVA), <i>Imaginal disk regeneration</i>
	Afternoon & evening labs	<i>Arthropods</i>
6/19/24 (Wed)	Morning lecture	Lesley Weaver (Indiana University), <i>Drosophila as a model to understand inter-organ communication</i> ; Heather Bruce (University of Chicago/MBL), <i>Arthropod legs: novelty and homology over half a billion years</i> .
	Afternoon & evening labs	<i>Arthropods</i>
6/20/24 (Thu)	Morning lecture	Anyi Mazo-Vargas (Duke U.), <i>Diving into butterfly wing patterning: Understanding genomic organization and signals driving diversity</i> ; Mike Perry (UCSD), <i>The insect visual system as a model for neural development and evolution</i>
	Afternoon & evening labs	<i>Arthropods</i>
6/21/24 (Fri)	Morning lecture	Jon Henry , (MBL), <i>Spiralians</i> , Dede Lyons , (SIO), <i>Nudibranchs as models for neurogenesis, and regeneration</i> .
	Afternoon & evening labs	<i>Spiralians (arthropods)</i>
	Dinner ethics discussion	Athula Wikramanayake , (Univ. Miami) and Tatjana Piotrowski , (Stowers Institute).
6/22/24 (Sat)	Morning lecture	Ehab Abouheif (McGill), <i>Ants: nature's ultimate superorganism</i>
	Afternoon & evening labs	<i>Arthropods and Spiralians</i>
6/23/24 (Sun)	Morning and Afternoon	<i>Free time</i>
	Evening lecture (8pm)	<i>Zebrafish orientation</i>
Module 4: Fish and Frogs (June 24-June 29) (Please note that there will be morning and evening labs, and afternoon lectures this week)		
6/24/24 (Mon)	Morning lab (9am)	<i>Zebrafish</i>
	Afternoon lecture (1pm)	Elke Ober , (FAU Erlangen, Germany), <i>Endoderm development</i>
	Evening lab (7:30-8:30pm)	<i>Zebrafish/ frog lab intro</i>
6/25/24 (Tue)	Morning lab	<i>Zebrafish, Frogs</i>
	Afternoon lecture	John Wallingford (Univ. of Texas, Austin), <i>Introduction to Xenopus development and The structure and function of the motile cilium interactome</i>
	Evening lab	<i>Zebrafish, Frogs</i>
6/26/24 (Wed)	Morning lab	<i>Zebrafish, Frogs</i>
	Afternoon Lecture	Tatjana Piotrowski , (Stowers Institute), <i>Zebrafish sensory lateral line development/regeneration</i> Marina Venero-Galanternik (University of Utah). <i>Zebrafish meningeal development</i>
	Evening lab	<i>Frogs, Zebrafish</i>
6/27/24 (Thu)	Morning lab	<i>Frogs, Zebrafish</i>
	Afternoon lecture	Andrea Wills , (Univ. Washington), <i>regeneration in Xenopus</i> ; Shinuo Weng (Johns Hopkins University), <i>May the Force Be with Frogs: From the Bottom Up</i>
	Evening lab	<i>Frogs, Zebrafish</i>
6/28/24 (Fri)	Morning lab	<i>Zebrafish, Frogs</i>
	Afternoon lecture	Michel Bagnat (Duke), <i>Guided and self-organized morphogenesis of the vertebrate anteroposterior axis</i> , Andrew Gillis , (MBL) <i>Skate development and evolution of limbs</i> .
	Evening lab	<i>Zebrafish, Frogs, Skates</i>
06/29/24 (Sat)	Morning lab	<i>Zebrafish, Frogs, Skates</i>
	Afternoon lecture 1:30pm	Yukiko Yamashita , <i>Learning heredity and evolution through the lens of Drosophila spermatogenesis</i> , (Katsuma and Jean Dan lecture).
	Evening lab	<i>Zebrafish, Skates, Frogs</i>
	Class presentations 9pm	<i>Show 'n Tell 2; lab clean up</i>
06/30/24 (Sun)		<i>Whale watching trip to Hyannis</i>
Module 5: Chicks and Mouse (July 1 -6)		
7/1/24 (Mon)	Morning lecture (9-11am)	Tatjana Sauka-Spengler , (Stowers Institute), <i>Introduction to chick development</i>
	Afternoon & evening labs	<i>Chick</i>
7/2/24 (Tue)	Morning lecture	Richard Behringer (MD Anderson). <i>Introduction to mouse development and vertebrate reproductive organ development</i> .
	Afternoon & evening labs	<i>Mouse (chick)</i>
7/3/24 (Wed)	Morning lecture	Peter Lwigale (Rice University), <i>Neural crest cells in corneal development</i>
	Afternoon & evening labs	<i>Chick and mouse</i>
7/4/24 (Thu)	July 4 th Parade	<i>Free time, parade. Course barbeque and fireworks</i>
7/5/24	Morning lecture	Ondine Cleaver (UTSW), <i>Introduction to mouse development and development of the vascular system</i>
	Afternoon & evening labs	<i>Chick and mouse</i>

(Fri)		
7/6/24 (Sat)	Morning lecture	Cliff Tabin (Harvard Medical School). How is the differential folding of the gut epithelium achieved; How did birds evolve the capacity to vocalize?
	Afternoon/evening labs	<i>Chick and mouse, softball game</i>
7/7/24 (Sun)	<i>Free time</i>	
Module 6: Cephalopods, Cnidarians, Ctenophores, Annelids (July 8-13)		
7/8/24 (Mon)	Morning lecture	Carrie Albertin (MBL) <i>Introduction to cephalopod development</i>
	Afternoon & evening labs	<i>Cephalopods</i>
7/9/24 (Tue)	Morning lecture	Leslie Babonis (Cornell), <i>Cnidarian development</i> ; Celina Juliano (UC Davis), <i>Introduction to Hydra</i>
	Afternoon & evening labs	<i>Cnidarians (cephalopods)</i>
7/10/24 (Wed)	Morning lectures	Neva Meyer (Clark University), <i>Annelids, nervous system evolution</i> ; Elaine Seaver (Whitney Laboratory for Marine Bioscience) Embryology and regeneration: an annelid perspective
	Afternoon & evening labs	<i>Annelids (cnidarians, cephalopods)</i>
7/11/24 (Thu)	Morning lecture	Josh Rosenthal (MBL), Rewriting genetic information in the brains of cephalopods by editing mRNAs (Kessel lecture); Bill Browne (Univ. Miami.), <i>Ctenophore development and evolution</i>
	Afternoon & evening labs	<i>Ctenophores (cnidarians, annelids, cephalopods)</i>
7/12/24 (Fri)	Morning lecture	Blanche Capel (Saunders lecture), Sex Determination with and without Sex Chromosomes,
	Afternoon & evening labs	<i>Cnidarians (ctenophores, annelids, cephalopods)</i>
7/13/24 (Sat)	Morning lecture	Celina Juliano (UC Davis), <i>Hydra regeneration (Rafferty lecture)</i> , Phil Cleves (Carnegie Science), <i>Cnidarian-algal endosymbiosis</i>
	Afternoon labs	<i>cnidarians, ctenophores, annelids, cephalopods</i>
	Class presentations, (9pm)	<i>Show 'n Tell 3</i>
7/14/24 (Sun)	Morning discussion	Athula Wikramanayake , (Univ. Miami) and Tatjana Piotrowski (Stowers Institute)
	Afternoon lab	<i>Lab clean-up</i>
	Evening (7:30pm)	<i>Course banquet and award ceremony</i>