Biology Foreign Studies Program (Bio 55,56,57): Winter 2019
Course description and grading policy

Instructors: Matt Ayres, Hannah ter Hofstede, Celia Chen

Graduate TAs: Flora Krivak-Tetley, Liz Studer

Textbooks: *The Tapir's Morning Bath* by Elizabeth Royte (Mariner Books)
Neotropical Companion by John Kricher (Princeton University Press, 2nd ed., 1997).
A Guide to the Birds of Costa Rica by Stiles and Skutch (Cornell University Press)
Costa Rican Natural History, edited by D.H. Janzen, University of Chicago Press.
A Field Guide to Coral Reefs: Caribbean and Florida. Roger Tory Peterson. 1982.
Reef Fish Identification: Florida, Caribbean, Bahamas. Humann and DeLoach. 2002.
Reef Fish Behavior: Florida, Caribbean, Bahamas. DeLoach and Humann. 1999.

Meeting times: Barro Colorado Island, Panama (7 - 15 Jan).
Various sites in Costa Rica (15 Jan - 18 Feb).
Little Cayman Research Center (19 Feb - 12 March).
See detailed schedules..

Course website: https://biology.dartmouth.edu/foreign-study-program

Ecological Research in the Tropics I and II (Bio 55 and 56)

The Biology Foreign Studies Program (Biology 55, 56, 57) exposes students, through intensive, full-immersion study, to Earth's most diverse biological communities. Biology 56 is a continuation of Biology 55; these courses comprise the first two-thirds of the FSP, and focus on land (tropical forests) and tropical freshwater ecosystems in Central America (Panama and Costa Rica). Biology 57 focuses on coral reef ecosystems in the Caribbean. Students are challenged to know, understand and appreciate the diversity of form and function in organisms, and the interactions that generate the often-spectacular patterns they see in the field. Habitats in Central America include lowland rain forest (Barro Colorado Island and Corcovado), cloud forest (Monteverde), dry forest (Palo Verde and Santa Rosa), pre-montane wet forest (Las Cruces), montane forest (Cuerici), alpine paramo, streams, and wetlands. The schedule is full, including fieldwork, laboratories, lectures and discussions, with emphasis on original research, mostly in small groups of 2-3. Faculty and advanced graduate TAs share field accommodations with students and are in continuous contact as mentors throughout the program. Students master field and analytical methods (including hypothesis testing, statistical and software skills) for observational and experimental research. We pursue a great variety of research topics, including plant-pollinator and plant-herbivore interactions, processes driving coral reef structure (and coral reef decline), determinants of species distributions, animal behavior, and conservation ecology. Students practice contemporary scientific inquiry: making observations, asking testable questions, generating hypotheses, developing experimental protocols, collecting data, making statistical inferences - including multi-model comparisons, writing scientific papers, and presenting seminars. Research papers are published in an annual book. Accommodations are at field stations in Costa Rica, and at a marine laboratory in the Caribbean.

Ecological Research on Coral Reefs (Bio 57)

Field and laboratory investigations of marine organisms and coral reef communities. A continuation of Bio 55 and 56 above. Lecture and research topics include studies of algae, aquatic plants, invertebrates, and fish, with emphasis on populations, species interactions, community structure and energetics, and reef conservation and management. The course is based at the Little Cayman Research Center, Little Cayman Island. Scuba diving is optional.

Prerequisite: Bio 16 plus one course for which Bio 16 is a prerequisite; acceptance into program.

Grading policy: Grades are based on the quality of research projects (including seminar presentations and resulting manuscripts); development of skills in natural history; development of skills in research design, statistical analyses, and strong inference; and development of skills as collaborators within research work groups.

Students with disabilities are encouraged to discuss them with the staff so that appropriate accommodations can be made.

Bio FSP 2019. Detailed schedule for Panama and Costa Rica.					Version of 17 Dec 2018
Date	**Day**	**Location**	**Morning**	**Afternoon**	**Evening**
7-Jan	Mon	To Panama City	Travel	Travel	Arrive in evening
8-Jan		To BCI	Travel	Orientation. Research tactics: questions, hypotheses, and predictions (MA).	**Lec: Katydid Research (HtH, KS).** Nightwalk.
9-Jan		On BCI	Orientation (guided hike)	Statistics (MA). SIP-1 research	SIP-1 proposals. SIP-1 pilot studies.
10-Jan		On BCI	SIP-1 research	**Tropical animal physiology (Mike Logan)**. SIP-1	SIP-1 research
11-Jan		On BCI	Vertebrates lab (ML & LS). SIP-1 development	Statistics (MA). SIP-1 research	SIP-1 research
12-Jan		On BCI	SIP-1 research	Writing lab. Plants & Arthropods lab (FKT, LS)	SIP-1 research
13-Jan	Sun	On BCI	SIP-1 research	SIP-1 analyses and context	SIP-1 symposium
14-Jan		On BCI	SIP-1 writing	SIP-1 v1 due. **Bat research (Inga Geipel)**	Evening on Porch
15-Jan		To San Jose	Travel	Travel	Exploration
16-Jan		In San Jose	OTS, Program overview	Museum. San Jose exploration	Group dinner in SJ
17-Jan		To Palo Verde	Travel	Orientation.	**Lec: Neotropical Ecology (MA, AB).** Nightwalk
18-Jan		At PV	Orientation. Vertebrates of Guanacaste	Teamwork (FKT). SIP-2 research development	SIP-2 Proposals. Nightwalk
19-Jan		At PV	SIP-2 research	SIP-2 research	**Lec: Forest ecology (FKT, HB)**.
20-Jan	Sun	At PV	SIP-2 research	Plants and Arthropods of Guanacaste	SIP-2 Research
21-Jan		At PV	Vertebrates practicum. SIP-2 research	SIP-2 research	**Lec: Plant-herbivore interactions (MA, EL)**.
22-Jan		At PV	River trip	SIP-2 analyses, context, and draft ms	SIP-2 symposium. SIP-1 final due
23-Jan		To Santa Rosa	Travel	Hike to Playa Naranjo. Orientation.	Field: sea turtles (LS)
24-Jan		At Santa Rosa	Mangrove ecology	Exploration	Field: sea turtles
25-Jan		To Monteverde	Travel	Orientation. Vertebrates of cloud forest	SIP-2 v1 due
26-Jan		At Monteverde	SIP-3 research development	SIP-3 proposals and research	**Lec: Social insects (MA, CP)**.
27-Jan	Sun	At Monteverde	SIP-3 research	SIP-3 research. Plants & Arthropods of cloud forest	**Lec: Host-parasite interactions (LS, TA)**.
28-Jan		At Monteverde	SIP-3 research. Colibri	SIP-3 research	**Avian Ecology (JQ).**
29-Jan		At Monteverde	SIP-3 research	SIP-3 research	**Lec. Cons Bio 1 (MA)**
30-Jan		At Monteverde	SIP-3 research	SIP-3 analyses and context	SIP-3 symposium. SIP-2 final due
31-Jan		To Cuerici	Travel	Travel; orientation	**Lec: Coevolution 1 (HtH, HM)**.
1-Feb		At Cuerici	Orientation	SIP-4 project development & proposals	Writing and research
2-Feb		At Cuerici	SIP-4 research	SIP-4 research	**Lec: Coevolution 2 (HtH, FC)**.
3-Feb	Sun	At Cuerici	SIP-4 research	SIP-4 research	Writing and research
4-Feb		At Cuerici	SIP-4 research	SIP-4 analyses and context	SIP-4 symposium
5-Feb		At Cuerici	Writing and exploration	Writing and exploration	SIP-4 v1 due. SIP-3 final due
6-Feb		To El Campanario	Travel to Sierpe	Boat, Sierpe to Campanario. Orientation	Nightwalk
7-Feb		At El Campanario	Orientation	Fauna and flora of Osa. SIP-5 development	SIP-5 proposals
8-Feb		At El Campanario	SIP-5 research	SIP-5 research	**Lec: Behav 1 (HtH, AW)**.
9-Feb		At El Campanario	SIP-5 research	SIP-5 research	**Lec: Arthropods (LS, JS)**.
10-Feb	Sun	At El Campanario	SIP-5 research	SIP-5 research	**Discussion: Creativity (SM)**
11-Feb		At El Campanario	SIP-5 research	SIP-5 research	SIP-5 research
12-Feb		At El Campanario	SIP-5 research	SIP-5 analyses and context	SIP-5 symposium
13-Feb		To Las Cruces	Travel	Orientation. Writing and botany	**Lec: Cons Bio 2: (FKT, JP)**.
14-Feb		At Las Cruces	Orientation	Botany and writing	SIP-5 v1 due
15-Feb		At Las Cruces	Writing and botany	Botany and writing	**Lec: Behav 2 (HtH, KG)**.
16-Feb		At Las Cruces	Writing and botany	SIP-4 final due. SIP-5 final due. Botany practicum	Wrap up
17-Feb	Sun	To San Jose	Travel to San Jose.	Swap gear at OTS.	Prepare for Caribbean
18-Feb		To Grand Cayman	Depart Hotel 04:30. Fly to Miami	Fly to Grand Cayman	Overnight in Grand Cayman
19-Feb		To Little Cayman	Fly to Little Cayman	Arrive Little Cayman Research Center	Orientation
12-Mar	Tue	To Miami	Fly to Grand Cayman	Fly to Miami. End of program.	

Papers for everyone to read in advance of BIO FSP 2019

#	Bio FSP 2019: Costa Rica. Papers for everyone to read.
00	ter Hofstede, H. M., J. M. Ratcliffe. 2016. Evolutionary escalation: the bat-moth arms race. *J. Exper. Biol*. 219:1589-1602.
00	Futuyma, D. J., A. A. Agrawal. 2009. Macroevolution and the biological diversity of plants and herbivores. *PNAS* 106:18054-18061.
00	Stork, N. E., J. McBroom, C. Gely, and A. J. Hamilton. 2015. New approaches narrow global species estimates for beetles, insects, and terrestrial arthropods. *PNAS* 112:7519-7523.
00	Crowder, L. B., D. T. Crouse, S. S. Heppell, and T. H. Martin. 1994. Predicting the impact of turtle excluder devices on loggerhead sea-turtle populations. *Ecological Applications* 4:437-445.

Papers are here:
https://www.dropbox.com/s/oufe26l4psvvblc/BioFSP.2019.StudentPapers-for-CentralAmerica.zip?dl=0

The zip file also contains the papers for student presentations. File name prefixes correspond to numbers at left in the bibliographies.

STUDENT PAPERS FOR BIO FSP 2019

What are the properties of a high-impact research paper in ecology and evolutionary biology? How can one distill the most interesting and important parts of an intellectually rich research paper so that colleagues can appreciate the value with only a few minutes of explanation? As part of our activities in Central America and in Little Cayman Island, each of you will be given about 20 minutes of undivided attention from your colleagues to rock their world with a scintillating synthesis from you, customized for them, of a high quality paper that we have chosen for you. Look up your paper in the accompanying table and find the pdf in the accompanying zip file (papers for Little Cayman have been delivered separately). Generally, the papers are associated with a lecture on the same topic, and generally the lecture will precede your presentation. So your audience will be warmed up.

We are sure you will want to read your paper for Costa Rica carefully before the program begins and your paper for Little Cayman before arriving in Little Cayman. The table is in the approximate order that your presentations will occur. Plan on about 12 minutes for your presentation, leaving about 8 minutes for the rich and sophisticated discussion that you will inspire. You will have a few minutes ahead of time to sketch some simple visual aids on the whiteboard that will be there.

We suggest that you take notes as you read your paper and bring questions ahead of time to the cognizant staff person regarding logic, technical approaches, vocabulary, relevant natural history, implicit theoretical models, etc. Also, talk with the staff person about what will be in the lecture that precedes your presentation so that you know what background your audience will and will not have previously received.

Take full advantage of knowing your audience. Help them connect your paper (beyond what the author could have possibly done) to your shared experiences on the program. Think broadly about how to start and end your presentation to grab the attention of your audience and later to leave them with new and lasting awareness. If you start and end your presentation as the authors have done with their paper then you have missed the opportunity to connect with your audience. If you start with "The title of my paper was …" we'll send you home.

We suggest the following structure for your presentation.

1. Provide the context that motivates the overarching research question. Frame the background in terms of general theory and big puzzles in ecology and evolutionary biology. Relate to the scholarship and experiences shared by you and your audience.
2. What is the research question? Seek to summarize the research objectives as a single thought-provoking sentence ending in a question mark. It is unlikely that you will find the perfect sentence for your purposes within the paper. Remember that all interesting questions have more than one plausible answer. Try to provide the context and identify the question without making reference to the particular study system in your paper.
3. Identify at least two possible answers to the research question that relate to general theory and big puzzles. Try to employ a simple graphic. Your goal is to make two possible answers sound so plausible and yet so incompatible that your audience can't wait to learn the outcome. This is not unlike how a good piece of writing in almost any genre captures the reader with suspense, intrigue, and interesting characters.
4. Describe the study system and technical approaches. Relate to things you and your colleagues have seen or will see on Bio FSP. Your aim is not to replicate the the paper by laboring through the introduction, methods, results, etc. Don't bore your audience. Filter to the information that is necessary for the story you are telling.
5. Present the results, including those that were not obtained but could have been. We suggest that you employ a very simple data figure, or schematic of the underlying theoretical model, and explain it. With a good visual aid, you can easily explain the different possible results, and having done that, finally tell them how it really came out. To continue the analogy with good writing, this is the climax. Make it meaningful and memorable. Note that the best visual aids for this purpose can rarely be taken directly from the paper (where figures and tables are designed to present detail and to be studied at length). You will need to develop a simplification from the package of figures, tables, and text in the results of the paper. Use your creativity, intuition, and intellect to imagine different possible visual aids and pick the ones that will work best for your audience.
6. Summarize interesting conclusions with respect to the study system and general theory. Remember to tell us what interesting possibilities we can now say are not true.
7. Identify important limitations of the study. Where are the edges of what we can and cannot say as a result of the study?
7. End broadly. Consider finishing with one or two thought provoking questions that might stimulate continuing thought and discussion. When you succeed well, there will be good questions at the end of your presentation, and you will hear people talking about your research paper days later.

Bio FSP 2019: Papers for student presentations in Central America (in order of occurrence).

#	Site	Lecture	Student	Student Paper	Staff
1	BCI	Katydids	KS	**Belwood and Morris. 1987**. Bat predation and its influence on calling behavior in Neotropical katydids. *Science*238: 64-67.	HtH
2	PV	Neotropical Ecology	AB	**McCain et al. 2009.** Vertebrate range sizes indicate that mountains may be 'higher' in the tropics. *Ecology Letters* 12:550-560. (*See also: Janzen, D. H. 1967. Why mountain passes are higher in the tropics. *American Naturalist* 101:230-243. Sheldon et al. 2018. Fifty Years of Mountain Passes: A Perspective on Dan Janzen's Classic Article. *American Naturalis*t 191:553-565.)	MA
3	PV	Forest ecology	HB	**Janzen and Martin. 1981.** Neotropical anachronisms: the fruits the gomphotheres ate. *Science* 215:19-27. [See also: Sanchez et al. 2003. Feeding ecology, dispersal, and extinction of South American Pleistocene gomphotheres (Gomphotheriidae, Proboscidea). *Paleoobiology* 30: 146-161.]	FKT
4	PV	Plant-herbiv interactions	EL	**Endara et al. 2017.** Coevolutionary arms race versus host defense chase in a tropical herbivore-plant system. *PNAS* 114:E7499-E7505. (See also: Ehrlich, P. R., and P. H. Raven. 1964. Butterflies and plants: a study in coevolution. *Evolution* 18:586-608.)	MA
5	MV	Social insects	CP	**Little et al. 2006.** Defending against parasites: fungus-growing ants combine specialized behaviours and microbial symbionts to protect their fungus gardens. *Biology Letters* 2:12-16. (See also: Schultz and Brady. 2008. Major evolutionary transitions in ant agriculture. *PNAS* 105:5435-5440. Currie et al. 1999. Fungus-growing ants use antibiotic-producing bacteria to control garden parasites. *Nature* 398:701-704.)	MA
6	MV	Host parasite interactions	TA	**Nowakowski et al. 2016.** Infection risk decreases with increasing mismatch in host and pathogen environmental tolerances. *Ecology Letters* 19:1051-1061. (See also Pound et al. 2006. Widespread amphibian extinctions from epidemic disease driven by global warming. *Nature* 439:161-167.)	LS
7	MV	Avian ecology	JQ	**Vanderbilt et al. 2015.** Variation in the performance of cross-contextual displays suggests selection on dual-male phenotypes in a lekking bird. *Anim Behav* 107:213-219. (See also: McDonald and Potts. 1994. Cooperative display and relatedness among males in a lek-mating bird. *Science* 266:1030-1032.	MA
8	Cuer	Coevol 1	HM	**Ramirez et al. 2011.** Asynchronous diversification in a specialized plant-pollinator mutualism. *Science* 333:1742-1746.	HtH
9	Cuer	Coevol 2	FC	**Herre, E. 1993.** Population-structure and the evolution of virulence in nematode parasites of fig wasps. *Science* 259:1442-1445.	HtH
10	El Camp.	Behav 1	AW	**Suselbeek et al. 2014.** Food acquisition and predator avoidance in a Neotropical rodent. *Animal Behaviou*r 88: 41-48.	HtH
11	El Camp.	Arthropods	JS	**Brady, S.G. 2003.** Evolution of the army ant syndrome: The origin and long-term evolutionary stasis of a complex of behavioral and reproductive adaptations. *PNAS* 100: 6575-6579. (See also: Rettenmeyer et al. 2011. The largest animal association centered on one species: the army ant *Eciton burchellii* and its more than 300 associates. *Insectes Sociaux* 58:281-292. Chadab and Rettenmeyer. 1975. Mass recruitment by army ants. *Science* 188:1124-1125. Schneirla, T. C. 1934. Raiding and other outstanding phenomena in the behavior of army ants. *PNAS* 20:316-321.)	LS
12	LC	Cons Bio 2	JP	**Galetti et al. 2013.** Functional extinction of birds drives rapid evolutionary changes in seed size. *Science* 340:1086-1090. (See also: Palacio and Ordano. 2018. The Strength and drivers of bird-mediated selection on fruit crop size: a meta-analysis. *Frontiers in Ecology and Evolution* 6)	FKT
13	LC	Behav 2	KG	**Irwin et al. 2001**. Speciation in a ring. *Nature* 409: 333-337.	HtH

DATE: November 26, 2018

TO: Students in the Biology FSP

FROM: Celia Chen

RE: **Readings for Coral Reef Ecology in Little Cayman**

While you will be immersed in tropical forest ecology and the flora and fauna of Costa Rica, you will soon be joining me in Little Cayman Island and diving into coral reef ecology. In order to help you prepare for the transition, the readings for Little Cayman are posted on Canvas and listed below. Each student is responsible for presenting a paper on a coral reef topic. Your assigned paper is on the list "Student Lead Papers" which will also be on Canvas. In addition, there are some papers and a textbook chapter that are required for everyone to read upon arriving at the Little Cayman Research Center. All of those readings are also posted on Canvas. You will only need to purchase the suggested book (see below).

Paper Presentations. You will present a synthesis of your paper much in the same way that you will present your papers in Costa Rica. You will also be able to talk with me or the TA's (Flora and Liz) about your topic prior to your presentation. In presenting the paper, distill it down to important information. Remember that you will be using a white board for your presentation so keep the messages simple. As with your earlier presentations in Costa Rica, you should present:

1) The topic or key questions addressed in the paper and the significance of this topic
2) What were the hypotheses that were tested? Briefly describe the approach or design of the study.
3) The main findings and conclusions (you may want to describe an important data figure in a simplified form). What is the significance of the findings
4) Most importantly, present your analysis of the paper. What were the strengths of the study and the weaknesses. Was the original question answered? What questions emerged from the study that could be pursued going forward?

As with your presentations in Costa Rica, you will have a total of 20 minutes so try to keep your presentation to 12 minutes. When you get to Little Cayman, you will get a schedule of events and will know when each paper will be presented. These presentations will not start until the 2nd week at Cayman. The list of papers are in a separate document and you can find them through Web of Science.

Suggested and Required Reading. The suggested books for the LC portion of the FSP include the Peterson Field Guide for Coral Reefs and the Humann Series of guides on coral, fish, and creatures. We have multiple copies of all of these at the lab. We also have "The Biology of Coral Reefs' by Sheppard, Davy, and Pilling (2010) which has useful chapters. I would recommend purchasing and reading ***Coral Reefs: A Very Short Introduction***, **by Charles Sheppard, 2014 (ISBN 978-0-19-968277-5)**. It is in paperback and not expensive.

There are several papers and a book chapter posted on Canvas that are required reading. They are as follows:

Levinton. 2014. Marine Biology: Function, Biodiversity, Ecology. 4th Edition Oxford University Press. Chapter 15, Section Coral Reefs, pp. 378-401.

Hughes et al. 2017. Coral reefs in the anthropocene. Nature 546: 82-90.

Darling, D.S. and I.M. Cote. 2018. Seeking resilience in marine ecosystems. Science 359: 986-987.

Albins et al. 2008. Invasive Indo-Pacific lionfish Pterois volitans reduce recruitment of Atlantic coral-reef fishes. Marine Ecology Progress Series 367:233.

Hixon. 2011. 60 years of coral reef fish ecology: past, present, future. Bulletin of Marine Science 87: 727-765.

Readings on writing scientific papers

In addition to scientific papers for presentation and discussion, we will have a discussion on the topic of writing scientific papers and attributing authorship credit. There are two papers on this topic.

Zhang W. 2014. Ten simple rules for writing research papers. PLoS Comput Biol 10(1): e1003453.

Weltzin et al. 2006. Authorship in ecology: attribution, accountability, and responsibility. Front. Ecol. Environ. 4(8):435-441.

STUDENT-LEAD DISCUSSION PAPERS FOR LITTLE CAYMAN BIOLOGY FSP 2019

Student	Lecture	Paper
Tanner Aiono	Fish biology	Miller, G.M., S. Watson, S., J.M. Donelson, M.I. McCormick, P.L. Munday. 2012. Parental environment mediates impacts of increased carbon dioxide on a coral reef fish. *Nature Climate Change* 2: 858-861.
Amanda Bak	Fish biology	Gerlach, G., J. Atema, M. J. Kingsford, K. P. Black, and V. Miller-Sims. 2007. Smelling home can prevent dispersal of reef fish larvae. *Proceedings of the National Academy of Sciences* 104:858-863.
Hanna Bliska	Zooplankton	Smith, J.M., G. De'ath, C. Richter, A. Cornils, J.M. Hall-Spencer, K.E. Fabricius. 2016. Ocean acidification reduces demersal zooplankton that reside in tropical coral reefs. *Nature Climate Change* 6: 1124-1129.
Flora Cullen	Mangroves	Lovelock, C.E., D.R. Cahoon, D.A. Friess, G.R. Guntenspergen, K.W. Krauss, R. Reef, K. Rogers, M.S. Saunders, F. Sidik, A. Swales, N. Saintilan, L.X. Thuyen, T. Triet. 2015. The vulnerability of Indo-Pacific mangrove forests to sea-level rise. Nature 526: 559-562.
Kevin Griffee	Invertebrates	Carpenter, R. C. and P. J. Edmunds. 2006. Local and regional scale recovery of *Diadema* promotes recruitment of scleractinian corals. *Ecology Letters* 9:268-277.
Eric Laderman	Sponges	De Goeij, J.M., D. vab Oevelen, M.J.A. Verimeij, R. Osinga, J.J. Middelburg, A.F.P.M. de Goeij, W. Admiral. 2013. Surviving in a marine desert: the sponge loop retains resources within coral reefs. *Science* 342: 108-110.
Hannah Marr	Coral calcification	Albright, R., Y. Takeshita, D.A. Koweek, A. Ninodawa, K. Wolfe, T. Rivlin, Y. Nebuchina, J. Young, K. Caldeira. 2018. Carbon dioxide addition to coral reef waters suppresses net community calcification. *Nature* 555: 516-519.
Quinn McCormick	Fish ecology	McMahon, K.W., M.L. Berumen, and S.R. Thorrold. 2012. Linking habitat mosaics and connectivity in a coral reef seascape. *Proceedings of the National Academy of Sciences* 109: 15372-15376.
Callie Page	Herbivory	Dixson, D. L. and M. E. Hay. 2012. Corals Chemically Cue Mutualistic Fishes to Remove Competing Seaweeds. *Science* 338:804-807.
Jonathan Park	Reef conservation	Cinner, J.E., C. Huchery, M.A. MacNeil, N.A.J. Graham, T.R. McClanahan et al. 2016. Bright spots among the world's coral reefs. *Nature* 535: 416-419.
Jason Qian	Coral-algae competition	Rasher, D.B. and M.E. Hay. 2010. Chemically rich seaweeds poison corals when not controlled by herbivores. *Proceedings of the National Academy of Sciences* 107: 9683-9688
Jenna Salvay	Fish behavior	Welch, M.J., S. Watson, J.Q. Welsh, M.I. McCormick, P.L. Munday. 2014. Effects of elevated CO2 on fish behavior undiminished by transgenerational acclimation. *Nature Climate Change* 4: 1086-1089.
Kyle Sullivan	Seagrass ecology	Lamb, J.B., J.A.J.M. van de Water, D.G. Bourne, C. Altier, M.Y. Hein, E.A. Florenza, N. Abu, J. Jompa, C.D. Harvell. 2017. Seagrass ecosystems reduce exposures to bacterial pathogens, of humans, fishes, and invertebrates. Science 355: 731-733
Alexa Wing	Damselfish and Lionfish	Davis. A.C.D. 2018. Differential effects o. native vs. invasive predators on a common Caribbean reef fish. Environ. Biol. Fish 101:1537-1548