

**BSC 3996L Natural History of Central America Laboratory/
Summer B Term, 2003**

SYLLABUS

Instructors

W. Anderson, B. Bennett, C. Brown, L. Collins, T. Collins, D. Childers, M. Donnelly, G. Draper, J. Fourqurean, J. Francisco-Ortega, E. Gaiser, W. Goldberg, S. Koptur, D. Lee, S. Oberbauer, J. Trexler.

Course Objectives

This is an introduction to hands-on research in Caribbean (including South Florida) environmental biology and geology. Four groups of two students help conduct research in four different labs or field areas to become familiarized with UMEB mentors' research programs. This course also serves as a final opportunity for students to change mentors before beginning their independent research projects.

Schedule

** means students should dress for the field - see description of activities for these mentors for more info.

	<u>UMEB Faculty</u>	<u>Meeting Time</u>	<u>Meeting Place</u>
<u>Group 1: Fabian Collins, Maria Pinzon</u>			
Thursday, July 10 – Friday, July 11	Dr. Ortega and Dr. Bennett	9:00 – 5:00 **	Fairchild Tropical Garden, Research Center
Thursday, July 17 – Friday, July 18	Dr. Ortega and Dr. Bennett	9:00 – 5:00 **	Fairchild Tropical Garden, Research Center
Thursday, July 24 – Friday, July 25	Dr. Fourqurean	8:30 – 5:00	OE 167
Thursday, July 31 – Friday, August 1	Dr. L. Collins	9:00 – 5:00	PC 349A
<u>Group 2: Alex Padron, Angie Zafiris</u>			
Wednesday, July 23 – Thursday, July 24	Dr. Koptur	9:00 – 4:00	call Dr. Koptur at 305-348-3103
Monday, July 28 – Tuesday, July 29	Dr. T. Collins	9:00 – 5:00	HLS 329
Wednesday, July 30 – Thursday, July 31	Dr. Brown	8:00 – 2:00	call Dr. Brown at 305-919-4793
Thursday, July 17 – Friday, July 18	Dr. Draper	9:00 – 4:00 **	PC 344
<u>Group 3: Andrew Davis, Elaine Fontes</u>			
Friday, July 11 and Monday, July 14	Dr. Anderson	July 11: 8:30 – 1** July 14: 8:30-5:00	PC 305
Call Dr. Gaiser at 305-348-6145	Dr. Gaiser	Day 1: 7:00am – ? Day 2: 9:00 – ?	OE 324
Tuesday, July 8 – Wednesday, July 9	Dr. Childers	July 8: 6:45 ** July 9: 9:00 – ?	OE 315
Call Dr. Lee at 305-348-3111	Dr. Lee	Call Dr. Lee	Call Dr. Lee at 305-348-3111
<u>Group 4: Ana Castellanos, Jon Arciniegas</u>			
Call Dr. Donnelly at 305-348-1235	Dr. Donnelly	Call Dr. Donnelly**	Call Dr. Donnelly at 305-348-1235
Wednesday, July 16 – Thursday, July 17	Dr. Goldberg	9:30 – 5:00	OE 258 (lab)
Monday, July 7 – Tuesday, July 8	Dr. Trexler	Field day: 6am – ? Lab day: call x1966	Field day: campus boat compound Lab day: call Dr. Trexler at x1966
Thursday, July 10 – Friday, July 11	Dr. Oberbauer	9:00 – 5:00	OE Greenhouse

Summaries of Activities with UMEB Mentors

Dr. William Anderson

We will collect plant samples (tree cores) for isotopic analyses.

Day 1 (July 11): Half day in the field at Big Cypress or ENP. This will be walking, so have boots, long pants and water.

Day 2 (July 14): Lab day.

Dr. Bradley Bennett & Javier Francisco-Ortega (combined activities)

Students should bring field clothes (long pants, long-sleeve shirt, enclosed shoes, hat, sunscreen, and insect repellent.)

Dr. Bennett: Students will collect samples of Florida's native woody flora for analysis in Dr. Ortega's lab. In the field at FTG and nearby areas, we will collect a voucher specimen and material for molecular analyses. Students will learn to prepare scientific voucher specimens and learn how to use diagnostic keys. In the lab, we will measure morphological characteristics of the Florida specimens and compare these to specimens from elsewhere in the Caribbean.

Dr. Ortega: Students will be introduced to DNA techniques to address conservation and population genetics questions. DNA isolation, PCR, gel electrophoresis of RAPD markers and analyses of data generated by RAPDs will be the most important components of this lab rotation. Students will learn about the ethnobotany of plants in coordination with the DNA studies.

Dr. Chris Brown

Students will be introduced to fish physiology and techniques in confocal microscopy.

Dr. Daniel Childers

Day 1 (July 8): Everglades field trip to sample floc at an experimental flow manipulation site in Shark River Slough. Students should be prepared for a full field day.

Day 2 (July 9): Lab analysis of floc samples collected the day before. Half day.

Dr. Laurel Collins

Students will be introduced to foraminiferal biology and paleoecology.

Day 1: Preparation of sediment samples, sorting specimens of foraminifera, and specimen prep for Scanning Electron Microscope (SEM).

Day 2: Species identification and paleoecologic significance; taking digital pictures of foraminifera with the Dept. Earth Sciences' JEOL 5900 Scanning Electron Microscope.

Dr. Timothy Collins

Day 1: Introduction to molecular lab techniques: PCR amplification and sequencing.

Day 2: Introduction to molecular phylogenetic methods: Analysis of data (produced on Day 1).

Dr. Mo Donnelly

Turtle sampling in the Florida Keys July 14-15 or 15-16.

Dr. Grenville Draper

Students should contact Dr. Draper earlier about field gear and clothing.

Day 1: Geology of South Florida field trip.

Day 2: Preparation and examination of rocks in thin section.

Dr. James Fourqurean

Students will be reintroduced to basic methods in seagrass ecology and biogeochemistry. They will learn basic techniques for assessing seagrass growth rate and population demographics. Students will be introduced to techniques used to analyze elemental content of plants and soils, including colorimetry and automated elemental analyses via high-temperature combustion and gas chromatography.

Dr. Evelyn Gaiser

Day 1: Field work, all day - ENP marsh - marking plants for productivity and collecting periphyton in shade and/or harvesting experiments. Wear long pants and shoes that you're not too worried about (we will be working in ankle-deep water and sawgrass). Sunscreen, bug spray/suits provided.
Day 2: Lab work - preparing and processing periphyton and plant samples from Day 1.

Dr. Walter Goldberg

Students will be introduced to the theory of SEM operation for an hour prior to lab for each of two days. Afterwards (late morning and afternoon) they will prepare buffers and fixatives for biological materials of their own choosing. On the second lab day (after lecture) they will critical-point dry, sputter coat, then operate the instrument (ISI Super 3A) and take photographs for records of their work.

Dr. Suzanne Koptur

Students will be introduced to insects as pollen vehicles, and specialization/generalization in pollination systems.

Dr. David Lee

Plant physiology: One day at Fairchild Tropical Garden, one day in the lab at FIU.

Dr. Steven Oberbauer

We will measure the physiological response of tropical trees seedlings to temperature. This will involve measuring photosynthesis, respiration, stomatal conductance, leaf temperature, leaf angles, chlorophyll fluorescence, and whole plant carbon exchange. We may also do some planting of seedlings and growth measurements.

Dr. Joel Trexler

Students will spend time separately in the field and lab. July 7 is Jon's field day and Ana's lab day. July 8 is Ana's field day and Jon's lab day.
Field day: Sampling Everglades fish. Wear old clothes (suggest long pants of a material that dries quickly, not jeans) and old shoes that can get wet and muddy. Bring a hat, your lunch, and some water.
Lab day: Sorting fish and macroinvertebrate samples.

Grading

Students are expected to be at the mentors' laboratories on time and to stay until activities are completed. You will be evaluated by each professor on the basis of your ability to carry through the assigned activities. Professors will make clear at the beginning of their time what is expected of you. Excused absences must be documented (*e.g.*, a doctor's note). The grades of the mentors will be averaged by Drs. Francisco-Ortega and L. Collins to determine the final grade.