This course will introduce you to genetic tools and analyses and how they have been applied to habitat conservation, harvesting, captive breeding programs, invasive species, and forensics. The optional laboratory provides hands-on training of open-source analytical software and published and unpublished datasets.

**Instructor:** Professor Erik Sotka  
**Email:** SotkaE@cofc.edu  
**Office Hours:** 1:00-2:00 PM Mondays and Wednesdays via Zoom ([https://cofc.zoom.us/j/3987124212](https://cofc.zoom.us/j/3987124212))  
**Communication:** The best way to get a hold of me is through my email. I will respond to you within 24 hours during the weekdays, and on or before Monday if you email after 5pm Friday.

**Required reading:**
- OAKS will be used for this course throughout the semester to provide the syllabus and class materials  
- Allendorf, Luikart and Aitken (2013) *Conservation and the Genetics of Populations*. Wiley-Blackwell. Purchase or rent via the bookstore or an online source.

**Lecture (3 credit)**  
For the first two months, I will describe the genetic tools and theory for conservation in both lectures per week. For the remainder of the course, I will introduce topics of conservation during one lecture, and we will discuss articles or have a Mini-lecture by graduate students for the 2nd lecture period per week.

**Laboratory (1 credit)**  
We are officially in the laboratory for 3 hours per week. The laboratory portion requires computer work, and thus access to a laptop is required.

**Student Learning Outcomes (Lecture)**

1) To understand the strengths and limitations of genetic tools and their application to questions in conservation.  
2) To demonstrate understanding of the modern state of the field in conservation genetics and how it is used in current research.  
3) To read, criticize and lead discussion of peer-reviewed papers

**Student Learning Outcomes (Laboratory)**

1) To demonstrate advanced use of open-source statistical software in R  
2) Use R to analyze population genetics problems and demonstrate their application to the scientific literature  
3) Use R to analyze phylogenetic questions and demonstrate their application to the scientific literature  
4) Demonstrate advanced development of oral communication skills
**Attendance policy:** This course is face-to-face and as such, I will be focusing Lectures and Laboratories in class. These lectures will not be live-streamed. If you are unable to attend Lecture because of illness of any kind, then you are expected to watch and listen to the Lecture recording later (email me for the link), take notes and email / ask me any questions you may have. Recordings are available for those that are unable to come to class because of illness of any kind. Before the drop/add deadline, students should decide whether the course plan on the syllabus matches their own circumstances.

**Grade (Lecture)**
Weekly quizzes / short answer (20%)
Discussion lead and DQs (DQs; 20%)
Mini-lecture (10%)
Take-home midterms (2; 25% each = 50%)

**Mini-lectures**
During the semester, you will generate one mini-lecture (30 minutes each) on a particular topic. The lectures should be thoughtful, organized, and critical of chosen articles. Each lecture should 1) outline the background of what we know and don’t know, and why the topic is important (e.g., dispersal of marine fishes, forensic analysis of whale meat) and 2) provide an **in-depth critical review** (What did they do? How did they do it? What did they find and how did they interpret it? What are the strengths and weaknesses of the study?) of at least 3 empirical articles on that topic. The articles should use molecular tools to address your topic. After the lecture, we will discuss the topic for 30 minutes. All other students will read the relevant chapter and any associated articles assigned by the instructor.

The topic choice is yours, but should be related to the general theme of the previous week’s lecture. For example, I’ll give a general lecture about Dispersal on Tuesday, and the two Mini-lectures in the following week will need to focus on Dispersal, but there are countless sub-topics that could be used for any one Mini-lecture (e.g., dispersal of parasites; dispersal and marine protected areas; sex-biased dispersal; gene flow in fragmented environments, etc…)

**Grade (Laboratory)**
Weekly Homework (50%)
**Final exam - practical** (50%)- This exam ensured you understand the basic toolkit and analyses that you find in a peer-reviewed journal like *Molecular Ecology*. You will find an article that has all (most) of its data freely available at publicly available servers (e.g., Dryad or GenBank). If the data aren’t available, then you can email the corresponding author and ask for the raw dataset. You will then be required to re-generate several (i envision three) analyses that were in the paper. The output is an oral presentation at the end of the semester of the two articles…what was interesting and important about the paper, its principal findings, its weaknesses, etc…
Grading Scale:
93 and above: A  
90-92.9: A-  
87-89.9: B+  
83-86.9: B  
80-82.9: B-  
77-79.9: C+  
73-76.9: C  
70-72.9: C-  
67-69.9: D+  
63-66.9: D  
60-62.9: D-  
below 60: F

Assignments and late policy: Assignments will be turned in on time to be considered for full credit. A loss of 5% will be deducted per school day for any late assignment. Zero points will be recorded for an assignment if it is not turned in before the assignment is passed back, discussed in class or key posted. Suitable means to turn in assignment via OAKS or email directly to the instructor (SotkaE@cofc.edu).

Computers: Unless you are told otherwise, all assignments should be completed on a computer.

Academic Integrity Statement: We follow all aspects of the College of Charleston Honor Code (see https://deanofstudents.cofc.edu/honor-system/).

Accommodations for Students with Disabilities: Any student eligible for and needing accommodations because of a disability is requested to speak with the professor during the first two weeks of class or as soon as the student has been approved for services so that reasonable accommodations can be arranged. Center for Disability Services/SNAP.

Inclement Weather, Pandemic or Substantial Interruption of Instruction: If in-person classes are suspended, faculty will announce to their students a detailed plan for a change in modality to ensure the continuity of learning. All students must have access to a computer equipped with a web camera, microphone, and Internet access. Resources are available to provide students with these essential tools.

Recording of Classes (via ZOOM): Class sessions will be recorded via both voice and video recording. By attending and remaining in this class, the student consents to being recorded. Recorded class sessions are for instructional use only and may not be shared with anyone who is not enrolled in the class.
Schedule (tentative)
All reading assignments are for the Allendorf et al. book, except where noted.

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<th>Week</th>
<th>Tuesday.Date</th>
<th>Lecture</th>
<th>Laboratory</th>
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<tr>
<td>1</td>
<td>11-Jan</td>
<td>Intro; History of Mol Ecol</td>
<td>Intro to R</td>
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<td>2</td>
<td>18-Jan</td>
<td>Genetic toolkit; HWE</td>
<td>Genetic diversity</td>
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<td>Genetic drift</td>
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<td>Fst and structure</td>
<td>Fstats</td>
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<td>5</td>
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<td>15-Feb</td>
<td>Phylogenies</td>
<td>Phylogenies</td>
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<td>7</td>
<td>22-Feb</td>
<td>Units of Conservation</td>
<td>Structure</td>
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<td>8</td>
<td>1-Mar</td>
<td>Dispersal***</td>
<td>FINAL PROJECT</td>
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<td>9</td>
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<td>Spring Break</td>
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<td>5-Apr</td>
<td>Invasive species I ***</td>
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<td>14</td>
<td>12-Apr</td>
<td>Invasive species II ***</td>
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<td>19-Apr</td>
<td>Presentation</td>
<td>21-Apr Practical</td>
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FINAL EXAM = April 28 1030-1230