Teaching Philosophy Christopher J. Clark

My teaching experiences include lecturing for 1/3 of a semester in Vertebrate Natural History, as well as Graduate Student Instructor (= TA) for discussion sections, field trips, and labs for Animal Behavior, Vertebrate Natural History, and Biomechanics, as well as intro Bio. In 2009 I received a "Teaching Effectiveness Award" from the integrative biology department, followed by an "Outstanding Graduate Student Instructor" award from the UC Berkeley Graduate Council. Altogether these experiences teaching science to undergraduates suggests that there are four essential parts: 1) introducing them to a core set of concepts, 2) helping them relate these concepts to their previous experiences and everyday lives, 3) exuding an infectious passion and enthusiasm for the subject, and 4) exposing them to the process and pitfalls of conducting actual research.

Core concepts are largely taught in a lecture setting. I try to emulate the tactics of my favorite undergraduate and graduate classes. I never missed a lecture of Dr. Morgan's genetics and population genetics courses, for he was especially good at laying out the classes' conceptual framework clearly and simply, with interesting examples. He would spend the first and last five minutes of lecture to preview and review what the day's lecture would be about—and research shows that such repetition is important for memory formation. It is tempting to flood powerpoint slides with information, and then lecture at a pace too rapid for the students to follow and appreciate the most important concepts. So, my style is to write out all key points on the chalk-board, and use powerpoint to illustrate examples with graphs, pictures, and movies. Since I write out the most important material in lecture, I lecture at the same pace at which the students can take notes.

Helping students relate to the concepts is done with in-class exercises, examples, labs, and field-trips. At Berkeley, Dr. Koehl would pause her lectures to use props, physical demonstrations, and videos to illustrate concepts in her biomechanics class. Likewise, the vertebrate natural history had a large number of field trips that got students outside to learn to identify the birds, mammals, reptiles, and amphibians. Within a couple weeks the students would realize on their own that campus is covered in juncos and other birds they had learned about in lecture, which brought to life examples they had learned in lecture.

Enthusiasm for the subject is infectious, and for undergraduates this is a powerful motivator. When lecturing on ornithology for a month in the vertebrate natural history class in 2007, I did my best to convey how interesting and exciting birds can be. Several students commented on this in my teaching evaluations, with comments such as "It's obvious Chris loves birds." and "I liked your enthusiasm and style". In my evaluations I scored higher than 6.0 in every category (on a 7-point scale, $n \approx 30$ students). In labs and field-trips, where interactions with students are more personal, I especially enjoy telling stories and humor as a part of the exercises, as a way of putting science –and scientists- in a human context to which students can relate.

Independent projects are also crucial. It's possible to get through lectures and labs without independent thinking; a research project is a more natural venue for teaching this skill. They teach students the exciting process of science, including thinking critically,

reading the literature, collecting data, using statistics, and so on. The vertebrate natural history class at UC Berkeley has the students perform a research project based entirely on their own observations of a local species of vertebrate. I enjoy steering students through the process of picking an idea, figuring out if it's feasible to study, collecting pilot data, through to showing them how to constructively peer-review each other's projects at the end of the semester. I won the "Outstanding Graduate Student Instructor" award by designing an assignment in which the students in the Vertebrate Natural History course peer-reviewed each other's final projects (double-blind), a few days before the final draft was due. Compared to previous years, the grades on the final paper improved, both because it forced the students to have a solid draft five days before the due date, and going through the act of peer review helped them see and correct common mistakes of beginning writers and researchers—much like graduate TAs learn quite a bit through teaching.

I have worked with ~15 undergraduate lab and field assistants, most of whom have gone on to medical, dental or graduate school. After helping me collect data on a project, some of them have embarked on independent projects related to my research. To perform a successful project, an undergraduate student needs to be pointed towards a simple, tractable problem that can be addressed with a modest amount of data, within a semester or two. In the case of Teresa Feo, once we obtained some interesting results from the field experiments, she decided to see if she could get Anna's Hummingbird's feathers to make sounds in the lab. We then worked together to set up and perform the lab experiments. Her honors thesis ended up in part of a PRSB paper, and she is the first author on a paper in the *Auk*.

Graduate Students

Students in the Clark lab will have research interests that intersect mine, such as bird flight, animal aeroacoustics, hummingbird biology, or courtship displays. My goal as a professor will not be to mint students that are clones of my research interests. Rather, my goal is to produce independent thinkers and researchers. Therefore, my graduate students will be expected to build projects and collaborations that include fields that I do not study, such as molecular phylogenetics, development, or endocrinology.