STATEMENT OF TEACHING ACTIVITIES
EILEEN A. HEBETS

TEACHING PHILOSOPHY

Virtually all of my professional accomplishments can be traced back to one person: Dr. Gail Stratton, an outstanding professor with whom I was fortunate to interact as an undergraduate biology major at Albion College. Serendipity is a funny thing. Dr. Stratton's response to my request for her to serve as my honor's thesis mentor – "*If you work on spiders, I will*" – changed my life forever. What followed was the most challenging, yet rewarding, summer of my life. I moved to Oxford, MS, and spent almost 12 weeks recording the songs and dances of spider courtship as part of a research program funded by the National Geographic Society. I can still hear Dr. Stratton's enthusiasm and excitement: "*Do you realize that you are probably the* first *person in the world to ever see the courtship of this species?*" My 19 year-old mind was blown! That level of intellectual enthusiasm epitomizes what I strive to instill in my own students – the excitement, potential for discovery, and global understanding that comes through study of the natural world.

My undergraduate experience profoundly influenced my personal and professional trajectories (a *huge* understatement) and led to my deep-seated appreciation for committed, engaged, enthusiastic, creative, passionate, and approachable faculty at institutions of higher education. Small liberal arts colleges such as Albion are renowned for the personalized educational style that fosters close faculty-student interactions and relationships. Developing these faculty-student relationships and personalizing education is arguably more difficult to achieve, but equally important, at large, research intensive institutions. However, with some effort and creativity, it is possible to achieve that level of connectivity, and this is what motivates my interactions with students at the University of Nebraska-Lincoln (UNL).

The philosophy underpinning my teaching approach is simple, and it aligns with two key goals of higher education: instilling and nurturing a student's enthusiasm, excitement, and interest in science sets the stage for independent learning and critical thinking. Once students are interested, independent learning and critical thinking come naturally. As an educator, I strive to harness my students' imaginations, to increase their awareness of the wonders of the world around them, and, importantly, to demonstrate how learning can be interactive *and* fun. I aim to present material in a way that is exciting, challenging, and accessible all at the same time – a non-trivial task. Nonetheless, through years of trial-and-error experimentation with distinct teaching styles, pedagogical tools, and assessment methods, I have begun to assemble some of the teaching tools essential for instructional success.

Learning Environment - The objective for my classroom – and, by extension, for my laboratory – is to generate a fun, dynamic, and interactive learning atmosphere. The importance of learning environment cannot be overstated, and *all* of my course content, activities, and assessment strategies are developed with this in mind. I work to create an atmosphere where students have the opportunity to take ownership of the learning process, to show off their knowledge to each other and to those outside the classroom, to act as role models, and to develop connections with each other and with the local community. As such, the lecture content of my courses is peppered with personal accounts of adventures in the field, failures and successes of past/present research projects, tales from conferences/invited seminars, etc. I find that personalizing the content works wonders to engage students and to peak their interest. I have shifted away from power point presentation over the years and now predominantly use the chalkboard – another trick that acts to engage students. While writing on the board, students not only have time to take their own notes, but the silence provides students an opportunity to ask questions. It is typical for 'lectures' in my

course to take major tangents based upon the often excellent questions of students. This inherent flexibility in my teaching style allows students to take some ownership of their education and allows them to engage more actively. Finally, I consistently highlight gaps in knowledge to make students realize that opportunities remain for *them* to make profound contributions to science; and through my role as instructor-of-record, advisor, or research mentor, I strive to provide opportunities to facilitate these contributions. In summary, while my classroom atmosphere is "fun" and "laidback" (as students mention in final course evaluations) it retains educational rigor and students are often surprised at how much they learn while still having fun.

Assessment - I champion non-traditional learning and assessment techniques that include, but are not limited to: craft activities to convey scientific content (*e.g.,* weaving a "web" with distinctly colored yarn and plastic canvas to learn how spiders build orb webs using different types of silk; or using clay and pipe cleaners to construct model arachnids to teach body plans and associated vocabulary); student-developed assessments (*e.g.,* working in teams to develop closed-book quizzes); and student-designed learning programs that are implemented in the local community (*e.g.,* after-school science clubs run by UNL undergraduates and learning modules that are piloted in local public school classrooms). Details of these can be found in my supplemental teaching materials.

Summary - My hope is that my somewhat non-traditional pedagogical approaches result in others experiencing the type of mind-blowing learning opportunities and experiences that Dr. Stratton provided for me as an undergraduate. Additionally, my passion for and curiosity about the world around me permeates all I do in the classroom, the lab, and the field. This is essential to inspire a similar passion for scientific learning and discovery among the students with whom I interact.

UNDERGRADUATE MENTORSHIP

In addition to the teaching that I do in the classroom, my research is extremely well-suited to undergraduate participation and as such, my laboratory is constantly filled with undergraduates. I began mentoring undergraduates during my PhD at the University of Arizona and continued at Cornell where I was the mentor of two undergraduate honors theses. In total, I have mentored more than 30 undergraduates and nine of my publications include undergraduate authors (with three additional *in prep* manuscripts). Four manuscripts have undergraduates as first author.

Working with undergraduates in my laboratory has facilitated the exciting entryway into entirely new fields/techniques for me and my research programs. For example, with a UCARE/INBRE student, Reed Stubbendieck, we embarked on a new collaboration with Dr. Anthony Zera to explore the role of ecdysteroids in the reproductive behavior of wolf spiders. No one in my laboratory had previously used radioimmunoassays and Reed's first-authored work, published in the *Journal of Arachnology*, was the first study to explore the relationship between ecdysteroids and reproductive behavior in wolf spiders (Stubbendieck et al. 2013). Similarly, UCARE student Matthew Hansen explored the relationship between the biogenic amine, octopamine, and mating tactic expression in a wolf spider. His work, which is currently in revision in the journal *Animal Behaviour*, is one of the first to explore a proximate mechanism underlying variation in reproductive behavior in spiders (Hebets et al. *in revision*). A current UCARE and honor's student, Alex Hansen, has generated one of the largest datasets on sexual dichromatism/dimorphism in any animal group. He is working through some sophisticated statistics in collaboration with a current post-doctoral research fellow (Matt Wilkins) in my laboratory to explore these patterns in an evolutionary context. Finally, another current honor's student, Rachael Schmidt, is documenting a new discovery of sperm activation in spiders! In collaboration with graduate student Malcolm Rosenthal, Rachael has already

demonstrated that the encapsulated sheath that surrounds the coiled spider sperm can be broken down, thus activating the sperm into mobile units, after ~8 hours in a saline solution. Prior to this study, researchers had been unable to activate spider sperm and thus, we currently know little to nothing about sperm dynamics in this group. Rachael's research will open up entirely new avenues of research in arachnology and animal sperm dynamics. These examples are provided to highlight the opportunities that I provide undergraduates for scientific discovery.

Awards and Recognition. In the spring of 2009 I received a certificate of recognition for contribution to students from the Parents Association and the Teaching Council of the University of Nebraska. In addition to this formal recognition, I *frequently* receive thank you notes from students following courses. The Office of Research also put forward my nomination for 'Professor of the Year' in 2014. Examples of recognition from students as well as materials for the Professor of the Year nomination can be found in the '*TEACHING AWARDS AND RECOGNITION'* section of the supplemental material.

GRADUATE STUDENT MENTORSHIP

In addition to the many undergraduates that I have mentored since arriving at UNL, I have graduated three PhD students (one was co-advised with Dr. William Wagner) and one Masters' student. I am currently advising 7 PhD students (one of which is co-advised with Dr. Brigitte Tenhumberg). My first PhD student defended her dissertation in the fall of 2009 and immediately began a post-doctoral research position at the University of Wisconsin-Milwaukee in the lab of Dr. Rafael Rodriguez, a leader in the field of animal communication. In the fall of 2014, she began a tenure-track assistant professor position at St. Louis University in Missouri. My second PhD student, Dr. Dustin Wilgers, received an offer from a small liberal arts college in Kansas immediately upon graduating. He started his tenure-track position at McPherson College in Kansas in the fall of 2011. Finally, my third PhD student, Dr. Steven Schwartz was awarded a competitive post-doctoral Endeavor Fellowship at Macquarie University in Australia and has just returned to the USA from this position. My students have done extraordinarily well and I take great pride in them. I firmly believe that mentoring students, both undergraduate and graduates, is one of the most important roles that we have as faculty members and it is a role that I feel I have excelled in thus far.

Scientific Environment - I work extremely hard to maintain an active, vibrant, fun, yet challenging atmosphere in my laboratory. I believe that I place the bar very high regarding scientific rigor and I have high expectations for all members of my laboratory, yet I try to facilitate a relaxed, fun atmosphere. I try to foster the sense of excitement and discovery in my students and encourage scientific discussions and collaborations. I hope, for example, that my laboratory will never be one in which a student is concerned about sharing an idea for fear of someone stealing it. Instead, I encourage my students and post-docs to engage in each others research – whether that means simply reading and commenting on manuscripts, brainstorming ideas, aiding with technical design, etc. I encourage this without the expectation of authorship, although, often the recipient of this help offers of their own accord. This was the type of atmosphere that I experienced during my NIH post-doctoral fellowship in Ron Hoy's laboratory at Cornell University and I thrived in that environment.

I have found that if students are happy, they are productive and if they enjoy the people that they work with, they will work more. Thus far, I have never had to reprimand a student for lack of effort. My current students all put incredible amounts of time into their research – often working long hours, weekends, and holidays. This is simply the work ethic of my laboratory and as new students enter the group, they see this as 'the

norm'. This is also the type of behavior that I model myself. I believe that this is one of the keys to running a successful laboratory – excellent role models. Because of this, I am very particular about new additions to my laboratory, for in the future, they will become the new role models. One bad seed can completely disrupt lab dynamics and thus, personality plays a large role in my decisions regarding both laboratory personnel and students.

Graduate Recruiting & Training - I believe in recruiting not only those students that look excellent on paper, but also those that clearly have the ambition, desire, and passion for science, regardless of their GRE scores. Through working with several students over the years, I have come to realize that often the best graduate students and the best scientists are *not* those with the best test scores, but instead, those that have a good work ethic and an innate ability, creativity, and passion for science.

I also feel that we, as academics, have a responsibility for training students that may not plan on taking a traditional academic research trajectory; for example, students desiring a Master's degree that they hope to apply towards a career in consulting, conservation, teaching, etc. In fact, it is through these students that we are most likely to make an impact on our society and thus, I take them very seriously. My only Master's student thus far graduated from our program and went on to get a teaching degree. He is currently an outstanding science teacher at North Star High School in Lincoln and I have no doubt that he is making a phenomenal impact on the students with which he interacts!

Graduate Mentoring Philosophy - I have found that I tend to take a middle of the road approach to mentoring with respect to the traditional categories of 'hands-on' versus 'hands-off' advising. I find that I play a *very* active role with students when they first arrive in my laboratory. For example, I try to guide students towards projects for which I know their work will likely pay off in the end. However, I ultimately allow my students to choose their own projects. Students are always more invested in ideas and projects that they have developed and thus I try to be sure that each student feels an ownership over their project. As a result, I tend to have students working on very different systems and often, asking very different questions. For an overview of research interests of my current students, see my *Statement of Research Activity*.

Graduate Student Successes – The graduate students that I have mentored at UNL thus far have been *extremely* successful in all aspects of graduate life: winning awards for research presentations at both internal and external venues; obtaining both internal and external research funding; obtaining highly competitive research fellowships (again, both internal and external); and publishing their research in peer-reviewed journals. One of my PhD students already had 7 published papers upon graduating from UNL! Some examples of external funding sources for my students include the National Science Foundation (both a pre-doctoral fellowship and a Doctoral Dissertation Improvement Grant), the Animal Behavior Society, and Sigma Xi. Internal awards won by students in my laboratory include an honorable mention for the Outstanding Graduate Research Assistant, Maude Fling Fellowships, and Dean's Fellowships. Specifics of graduate student honors and awards can be found in the '*Student awards and recognition'* section of the supplemental material.

COURSES TAUGHT

Since arriving at UNL, I have taught lower-level undergraduate (100 level), upper level undergraduate (400) and graduate level courses (800 and 900) in the School of Biological Sciences. I have also taught a field

course through the Organization for Tropical Studies (OTS). The complete list of courses is shown below. Many of these courses I have taught multiple times and these details as well as examples of their content can be found in the supplementary teaching files.

- Research and Design Seminar (BIOS 996)
- Introduction to Zoology (BIOS 112)
- Behavioral Ecology (BIOS 955)
- Principles of Behavioral Ecology (BIOS 998/804)
- Behavioral Ecology Seminar (BIOS 915)
- Developmental Plasticity (BIOS 998)
- Arachnology (BIOS 497/897)
- Communicating Science through Outreach (BIOS 497/897)

LITERATURE CITED

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Stubbendieck, R. M., A. J. Zera, and E. A. Hebets. 2013. No evidence for a role of ecdysteroids in the reproductive behavior of *Schizocosa* wolf spiders. Journal of Arachnology **41**:349 - 355.