Teaching at Gustavus

I believe that higher education should encourage students to develop a well-rounded foundation firmly rooted in the liberal arts tradition. I am a broadly trained biologist who teaches across a wide range of subdisciplines. As a research scientist, I focus on questions related to plant evolutionary and physiological ecology. At Gustavus Adolphus College, I have found opportunities to develop skills as a teacher, mentor and researcher while contributing to a clear, college-wide mission of a student-centered, interdisciplinary education.

Biology is the study of life, so it seems natural to find the subject intriguing. I have an opportunity to teach how organisms function as individual cells or integrated collections of cells, how organisms change over time, and how organisms interact with their environment. Teaching provides an opportunity to discover fascinating phenomena and to see how ideas are re-interpreted with new experimental data. My students report that one of my primary strengths is enthusiasm for my subject. "She is very passionate about work and teaching the course and excited about the topics." I maintain a positive and energetic approach in my teaching and students see this. "She has an energy that is second to none among profs at GAC. She takes topics that aren't appealing to all students and makes them fun to learn about." "You can tell she is very enthusiastic about her work and she conveys that in a way that gets students enthused about it also." Biology has ties to many other disciplines and at Gustavus I have the freedom to explore the interdisciplinary connections to other sciences, math and the humanities. I love sharing my passion for environmental studies and biology with our students. "I enjoy her willingness to incorporate other disciplines into the course. A true liberal arts professor!"

The quality of my work can be defined in different ways. I achieve quality work when students reach a higher level of competence in the subject area, "Dr. Kittelson takes the time to thoroughly explain topics while challenging and pushing us to develop professional attributes." Quality can be defined by a sense of pride that my students have in what they have learned. "The literature review was the most enjoyable to me. I really learned a lot from the peer review session and from the professor's comments. Seeing the final transformation of my paper after that step was probably the most rewarding experience." Quality also is manifested when students realize that their potential and interest can be nurtured through independent means. "I…feel confident that my interest in Biology has been sparked, in that I care to learn more about the things that impact our world and environment." "I have learned a ton about biology, because she made it interesting for me to keep wanting to learn." Quality is also apparent when students appreciate the subject, even if initially reluctant, "Before this course started, I wasn't was really excited because plants were never a major area of interest for me, but almost immediately after the class started, my interest in the subject grew, and this became one of my favorite classes." Quality occurs when I can open new doors. "She has single handedly made me consider becoming an ecologist." Quality can be reflected in the respect that colleagues have for your work, "She incorporates a personal style that is enthusiastic, compassionate and rigorous into all that she does and her students love her for it. I think they sometimes surprise themselves at the output they are capable of under Pam's tutelage." Finally, quality work is demonstrated when I know that I have done my job well. I love teaching biology and I have high standards; I am constantly evaluating and modifying approaches based in part on student feedback and my own expectations. Thus, enthusiasm, interest in my work and quality of my work are synergistic.

One of my goals is to provide students with intellectual confidence so they gain knowledge independently. Another objective is to help students build a set of skills that can result in success

in any vocation. To fulfill these goals, I use the scientific method because it is a profoundly effective way to know and understand the world. In my classes, students test hypotheses, analyze data and present conclusions. They must be capable of deciphering or constructing graphs. My students must manipulate equations that describe biological phenomena. By the end of a course I expect them to recognize good experimental designs and draw conclusions from statistical summaries, even if it is contrary to expectation. Taking a position and supporting one's opinion with data is a powerful approach toward making sense of many issues, and will help individuals become well-rounded citizens, capable of making informed decisions.

I also want students to refine skills as communicators. From my 100 to 300-level courses I emphasize writing and public speaking. In the upper division courses I assign three to eight short reports based on data they collect. "The short assignments really make you push for clarity and brevity…" Larger writing projects are also required and include literature reviews, grant proposals or independent research papers, "…the literature review was one of the most extensive papers I've ever done. You had to interpret and synthesize a huge amount of material and show connections between various areas." Students report significant improvement in writing abilities by the end of the course. "This class has helped me to be more concise in my writing and how to help the reader understand and follow my logic."

Like writing, effective public speaking extends across the curricula and it is a major requirement in each class I teach. Students give small group presentations or present independent research results in a symposium format. When discussing primary research articles, students explain graphs or statistical analyses, they read opposing sides of issues and debate, or they choose a paper and lead the discussion. As the semester progresses, they become more fluent in cutting-edge research, comfortable questioning one another and confident in critiquing the material. I enjoy my role as a guide, not simply a purveyor of information.

I challenge students to take control of their own learning. "She pushed us to figure out things using available resources and think creatively and deductively, rather than just give us all the answers." "She gave a good variety of assignments and used different methods, including hands-on, which made things more interesting and easier to understand. She was flexible, but still pushed us." By incorporating more active learning into class, my students have the opportunity to excel in their strengths and develop new methods for synthesizing the material. "She has the students get involved during her lectures and in discussion." I use recent research or local issues as case studies. I bring in new articles to demonstrate the dynamic nature of biological discovery and its relevance to their lives. "She is very good at explaining complex concepts and relating biology topics to issues in the real world."

I challenge students to put forth their maximum effort. In addition to a writing and discussion-based approach, my students must synthesize a tremendous amount of material, but as one student states, "you learn an incredible amount without it seeming like it's too much to handle. She's challenging in a way that makes you determined to measure up to her standards, but not in a frustrating way." I focus on biological concepts rather than surveying terms; I ask students to analyze trends and apply information. I encourage students become self-directed without dictating a single way to 'fill in the blanks'. "She made me want to understand, not just for a test, but for the mere objective of knowing. I'm confident now."

I believe in the power of experiential education and value the opportunity to explore this approach over January term. In my travel course, we explore desert and coastal ecosystems using the

University of California Natural Reserve System. The reserves function as living laboratories and actively support research as a means to shape conservation policy. Students consider the broader implications of individual actions by developing a better sense of self and community, and I challenge them to contribute toward effective environmental stewardship. I love teaching this course because it provides me with a more complete picture of our students, their values, perceptions and talents. Each group has developed a unique dynamic, overcoming barriers common to campus interactions. Field courses were an important component of my own college experience, so I am thrilled to offer students the kind of educational opportunity that significantly shaped my own professional interests and career objectives.

Another important aspect of my job is that of an advisor. I advise students in three majors: Biology, Life Science Education and Environmental Studies. I encourage students to explore options, build connections among diverse courses and find their niche. We frequently talk about the unparalleled opportunities that a liberal arts education can offer. It also is my job to actively discourage students from over-reaching or padding transcripts with unnecessary double majors or activities. I recommend that they experience new environments, take calculated risks and talk openly with parents about their interests. I enjoy knowing our students personally and celebrating their accomplishments.

The history of my subject has taught me that few truths exist in ecology and that perceived truths can be transitory in a relatively new and synthetic field. Rather than just teaching 'facts', a good science education should provide students with the ability to ask important questions, design appropriate experiments and draw conclusions from data. Understanding nature comes from testing, retesting, building models and devising overarching theories. Moreover, students should be able to write and speak about ideas in a straightforward manner. My goals are to provide students with the ability to understand the complexity of the natural world, and to encourage them to contribute to the process of building potential explanations. I also believe that my methods help students succeed at Gustavus and raise their performance on all levels so that they can be well prepared for future endeavors.

Professional activities

My professional activities strengthen my abilities as a teacher. Research keeps me immersed in the primary literature, interested in new ideas and innovations, and provides an outlet for my creativity. My research and scholarly interests broadly encompass the evolutionary ecology of plant populations, specifically questions related to the diversity of plant populations.

In California, I investigated how the genetic architecture of a population was influenced by reproduction and natural selection and clarified important causal mechanisms of evolutionary change in small geographic areas. At Gustavus, my undergraduate research program focuses on questions related to diversity in fragmented systems such as tallgrass prairies or oak woodlands. My students and I examine interactions between plant species, animal diversity and physical attributes, such as nutrient cycling. I also use a molecular tool called AFLP (Amplified Fragment Length Polymorphisms; polymorphisms literally mean ‘many forms’ and refer to the variability inherent in one’s genetic code) to measure the variability in plant populations. We have collected and analyzed DNA from leadplant, *Amorpha canescens*, hoary puccoon, *Lithospermum canescens* and bur oak, *Quercus macrocarpa*. By comparing diversity among species, our work will contribute to a more thorough understanding of how plants respond ecologically and evolutionarily to isolated, fragmented landscapes.

My research program gives students the opportunity to conduct their own research and to think critically about issues. Students attend lab meetings where they help develop experimental design. They assist me in the collection and analysis of data; they become more independent and confident. Their commitment to the projects often leads to innovative approaches. Reciprocally, the need to communicate my goals focuses my thinking. In addition to providing a valuable service for The Nature Conservancy and Minnesota State Parks, my students have made important multi-agency connections that have led to career opportunities. I also am writing three manuscripts with students and hope to submit these articles by next spring. In 2002, I took three students to the ESA conference in Tucson where they presented a research poster. This past summer I attended the ESA conference in Portland with three of my research students; we presented two posters. Taking students to national conferences in the summer has been a lot of work, but attending these events gives the students a better understanding of how good their research is and models the different ways they can make contributions to science. I enjoy exploring the theories that ecological and evolutionary research produce. I look forward to deepening my experiences as a researcher and explaining patterns in the natural world.

I will continue to provide students with opportunities to develop intellectually, and to realize their talents and ability to make valuable contributions. I value, and try to model my love for, interdisciplinary learning. Diverse perspectives abound in academia and I believe that significant learning happens outside of the classroom; I have so much to learn from my colleagues and students, from 'aimlessly' wandering the library, art gallery or trail, and being at Gustavus allows me the pleasure of exploring the intersections of my field with others. I am a biologist, who also is a naturalist and an environmentalist; knowledge of organisms and complex, living systems feeds a deep love for the beauty of life, and this leads to a desire to be a good steward. I try to communicate my value system to students and colleagues. Environmental issues dovetail with social issues, thus, service to biological communities is a form of civic engagement that has multi-generational ramifications for improved human and ecosystem health. One student writes, "The fact that you are not just a professor, but also an advocate for our environment, has really made a positive impact on me." I support students outside the classroom *and* I simply want new experiences to enrich my life so I may ultimately offer something to others.

Gustavus Adolphus College offers the kind of environment that sustains my professional and personal interests significantly. By contributing to this community, I help students and myself maintain a passion for education, for service to and knowledge of the world.

All quotes were taken from official student evaluations, thank-you notes or review letters; these sources can be found in my tenure file.