

# Teaching Statement

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I accord equal weight to teaching and research because I believe they inform and reinforce each other. In my course preparation, I take a proactive approach. I try to anticipate the questions that students might ask about the subject matter. Often, this process directly inspires my own research projects, especially in graduate teaching. For instance, while preparing a lecture on the method of maximum entropy on the mean, I realized that the method could be extended to the small-sample situation, an insight which led me down a path I had never before considered. Moreover, I believe teaching graduate students advances my mastery of the subject, as does fielding some of the more challenging questions posed by my undergraduate students. After explaining continuity and differentiability of a real valued function in calculus class, I asked myself what the derivative of a digital image might be. If the discontinuities in an image are *visually* obvious, what is the link with the mathematical notion of continuity? This type of persistent inquiry stems from my view that scientific knowledge is not a closed set of concepts that students must memorize and recite back verbatim, but rather a collection of great ideas that should be worked and played with in order to garner a greater understanding. Like John Dewey, I believe that education should teach us how to think rather than what to think. What is more, I find this teaching philosophy goes a long way in reassuring students who may be anxious about or who may have an aversion to mathematics.

In a related vein, my role as a teacher goes beyond that of a simple top-down purveyor of information. I see myself as somewhat a librarian and / or a counselor-I guide students to resources that help them reach their personal goals. I am always available to my students and I encourage them to be inquisitive and think scientifically. As a general rule, I make it a point to be the last person out of the classroom so as to give extra help to students with any residual questions. During office hours, I always keep my door open and gainfully use this time to work on all sorts of problems students might have.

I've taught numerous amphitheater classes to audiences of 100 or more students in elementary college mathematics courses including: calculus I and II, linear algebra, discrete mathematics and introductory probability and statistics. In these classes, students must learn an oftentimes new and sometimes off-putting scientific vocabulary, which many find highly challenging. Early on, as a less experienced teacher, I made a fundamental mistake. My first lectures were only fully accessible to a small number of particularly bright students who had taken certain prerequisite courses and who were already familiar with complex mathematical notational systems. I've corrected this error by giving out introductory chapters on each course, which provide the basic knowledge required for understanding the new material, e.g., the Greek alphabet, or, in elementary probability, finite and infinite unions and intersections, etc.

Teaching mathematics is also fighting innumeracy or mathematical illiteracy. Striking examples of how numbers, shapes or chance can mislead just about anybody can be found in [1], [2] or [3]. I like to present a selection of challenging questions that will later be solved or at least reformulated using the proper mathematical tools. Examples in probability include the "Monty Hall" problem, Bertrand's paradox and the waiting time paradox.

In conclusion, one of the highlights of my teaching career has been doing project-based work with my students. For me, few pleasures rival seeing my students actively engaged in problem-solving and as excited and curious about mathematics as I am.

#### REFERENCES

- [1] M. Orkin. *What are the Odds?: Chance in Everyday Life*. W.H. Freeman, New York, 1999.
- [2] John A. Paulos. *Innumeracy: Mathematical Illiteracy and Its Consequences*. Hill and Wang, August 2001.
- [3] Nassim Nicholas Taleb. *Foiled by Randomness: The Hidden Role of Chance in the Markets and Life*. Paperback: Random House. Hardcover: New York, and London: Thomson Texere, April 2004 (1st Ed. November 2001), 2004.