

Teaching Statement

For me, teaching at the beginning undergraduate level is tantamount to good storytelling. In the autumn school quarters over the last two years, I've been fortunate to serve as a teaching assistant for MATH 51, Stanford's entry-level class aimed at the majority of incoming freshmen. In ten weeks, this fast-paced class, aimed at the majority of incoming freshmen, covers the basics of linear algebra and multivariable differential calculus while trying to impress upon students the importance of abstract mathematical reasoning. This is much faster and heavy-going than most students prefer, and my recourse to this is to provide them a comfort zone, both intellectually and emotionally, by telling good stories in class.

I believe that anything can be made into a story. One memorable instance of this was the following question: *find the largest possible sphere, centered around the origin, that can be inscribed inside the ellipsoid $3x^2 + 2y^2 + z^2 = 6$* . At first, my students had little intuition for this problem. I then asked them to pretend they were in the middle of a dome-covered football field blowing up a balloon; this was something everybody could easily visualize. When I told them that the football field represented the ellipsoid and the balloon represented the sphere, intuition suddenly dawned on many students. After a student asked about the physical meaning of "inscribe", I then reformulated the original question as — *how much air can you blow into the expanding balloon before it touches the walls of the football field?* This was an amazing moment, as I felt the original problem suddenly making complete sense to all!

I try hard to foster an environment in which students feel comfortable listening to such explanations and interrupting with clarification requests; if students can feel a greater sense of "story ownership" via this interactivity, they're much more likely to remember it. To this end, I take it as an imperative to learn the names of all my students; as my discussion section sizes tend to be around 20 students, I'm able to accomplish this within the first two weeks of class.

My students seem to greatly appreciate this type of individualized attention. With the shyer students, the individual classroom interaction may be limited to the time that I deliberately take at the beginning of class to personally hand back assignments, or, if they come late, the care that I take to promptly return their assignments without impeding the flow of conversation. Especially with these quieter students, these intentional acts are meant to signal to them that they *do matter* — the class is not meant just for the vocal students.

For many entering freshmen, MATH 51 is a terrifying class; it is rewarding for me to make mathematics less imposing and more accessible for students struggling with it. As a teacher, I seek not to portray myself merely as somebody charged with conveying mathematical ideas, but also as somebody who *cares*:

- "Jon is a great guy, really positive towards students, and encouraging. His attitude is great."
- "Jon was a great teacher. I really appreciate all the help he provided for us, and his sincere understanding for each student as well."
- "Amazing job leading section and trying to get certian [sic] students to stop complaining about learning!"

— *final student evaluations from the Autumn 2008 offering of MATH 51*

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It is also gratifying for me to instill ideas in more mathematically mature students, thus spurring their interest to learn more mathematics. For the last two years, I have written problems for Stanford's local computer programming contest, intended to train and select students for higher levels of competition. By doing this, I am able to use my mathematics background to push the participants, typically more heavily focussed on computer science, to think harder mathematically; at the same time, I take this as an opportunity to maintain my own background in computer science.

Mathematically, two of my most enjoyable teaching experiences have been the summers in 2007 and 2008, when I volunteered as a counselor for SUMaC, Stanford's high school math camp. It was immensely rewarding working with the other counselors to not only teach, but also to inspire and to cultivate interest in impressionable young students. For many of them, SUMaC is their first connection to mathematically minded peers, and I feel privileged to have contributed to this.