TEACHING STATEMENT: ANNA SEIGAL

**Teaching Philosophy.** What do you think about, when you think about maths? During my undergraduate studies at the University of Cambridge I became fascinated by this question. I wanted to understand how people learn a mathematical concept. Since my experience was highly visual, I was intrigued by the role that mathematical visualizations played for other people. During my master’s studies I made a short documentary on the topic[1] which has been screened a number of times, most recently at San Francisco State University. Understanding a mathematical concept is much more than recalling a definition. It means obtaining a working knowledge for an idea, be it a vector space, a group, or a sheaf. For my students, I am focused on making this journey enjoyable, enlightening, and rigorous.

I encourage students to approach mathematics in a calm and deliberate way, by being patient and thorough in my explanations. I teach them specificity in determining which part of a question or concept is thwarting them. The process of zooming in on an area of confusion often allows them to resolve the confusion, and they develop problem-solving skills for the future. When teaching non-math majors, I design inspiring examples (see Figure [1]) which enable students to connect the topics from class to their lives and careers, for instance to make financial decisions, or to use their knowledge of a $p$-value when reviewing a new treatment as a doctor.

![The Daily Cal: Math 10B Special Edition](http://imaginingthings-blr.tumblr.com/)

**Figure 1.** Header from one of my worksheets

**Teaching Experience.** During my PhD at UC Berkeley, I was a Graduate Student Instructor for a freshman mathematics class for students in the life sciences, *Methods of Mathematics: Calculus, Statistics, and Combinatorics*, known as Math 10A and Math 10B. I held discussion section for six hours per week, each section with around 30 students. In section, I reviewed key concepts from the lecture, and made a worksheet of

examples for the students to do in small groups. I also held weekly office hours, wrote a weekly quiz, and graded homework, quizzes and exams. In the Spring 2017 semester I was appointed the Head GSI for the class. In addition to the usual responsibilities, I coordinated the five other GSIs, and wrote homework problems and solutions for the 600 students. I have also acted as a stand-in lecturer for upper division math classes, teaching topics such as fields with valuation and classical algebraic varieties. I greatly enjoy teaching and find it immensely rewarding. At the end of the class students rate their instructors on a scale from 1 (poor) to 7 (excellent). In the three semesters I received average ratings of 6.0 (Fall 2015), 6.4 (Spring 2017) and 6.5 (Spring 2018). The departmental average is 5.4.

In the future, I am greatly looking forward to teaching upper division math classes and to inspiring the next generation of mathematicians. The classes I would be most interested to teach include abstract algebra, algebraic geometry, combinatorics, and linear algebra, as well as theoretical statistics and optimization. I am also eager to teach all lower division math classes. To navigate today's data-driven world, it is more important than ever for everyone to have mathematical ability and confidence. I would like to develop a class for undergraduates called Mathematics of Data, on the mathematical foundations of data analysis, and I would also like to develop a graduate class on research topics in the mathematics of data.

**Teaching Evaluations.** Comments from teaching evaluations and emails:

- ‘Anna is a fantastic GSI! She is definitely the best and most responsible GSI I have had so far at Berkeley.’

- ‘Very organized, very knowledgeable, very helpful during office hours, motivates students to do their best. Overall a fantastic GSI!’

- ‘You really took the time to connect the material we were being taught in class to our career interests.’

- ‘No other GSI, in my experience, really showed how much they cared about their students’ success.’

- ‘Really willing to answer questions and work through problems with students. Super energetic and always happy, very amicable person, makes you feel welcome and a very fair teacher. Super thorough, really enjoyable.’

- ‘Anna is the BEST GSI I have had yet! She comes so prepared and always have worksheets for us every section and makes sure to post the answers that we can look over for the quizzes. I always feel so prepared and I feel that I learn the most from Anna. She is always willing to answer questions, and she is active in making sure we are all focused and engaged. Best attitude towards students and always available. Truly a gem.’
Mentoring. Being a role model to women in mathematics is very important to me. I have taken on several mentoring roles during my PhD. I organized a semester-long mathematical biology reading group for a group of Berkeley undergraduates. I also tutored a group of graduate students at Berkeley for the Prelim exam. I volunteered at Expanding Your Horizons in Berkeley, a conference for middle school girls to engage them in STEM activities.

I mentored three students through Berkeley’s Directed Reading Program, which pairs undergraduates with graduate students for reading projects. The projects were: *Algebraic Statistics for Computational Biology*, the textbook by Lior Pachter and Bernd Sturmfels, *Combinatorial Commutative Algebra*, the textbook by Ezra Miller and Bernd Sturmfels, and *A computational algebra approach to the reverse engineering of gene regulatory networks*, a paper by Reinhard Laubenbacher and Brandilyn Stigler. It was rewarding to challenge the students and help them to realize their mathematical potential.

Blogging. I co-run a blog *Picture This Maths* in which I write about mathematics for a wide audience, centered on pictures. The pictures aim to replace the ‘dry’ impression of mathematics that many of my friends and family (used to) have. Our blog has received 30,000 visitors from 160 countries and has been featured on the AMS Blog on Math Blogs. As a result of the blog, I receive invitations to write general mathematics articles. I wrote a series of three articles for SIAM News, and also wrote a contribution to the Oberwolfach Snapshot Series, articles written for a general mathematical audience on current research topics, published by the Mathematics Institute at Oberwolfach. My article[^1] is called “The Algebraic Statistics of an Oberwolfach Workshop”.

[^1]: http://picturethismaths.wordpress.com/
[^2]: https://publications.mfo.de/handle/mfo/1337