

Teaching Summary

From 2000-2002, while a graduate student at the University of Texas, I served as a teaching assistant for several calculus, linear algebra, and differential equations courses and received high instructor ratings (between 4.5/5 and 5/5). As a consequence of my high ratings and faculty letters, I received the graduate teaching award in 2003, was nominated for a university wide teaching award, and was asked to speak on behalf of all teaching assistants at the College of Natural Science teaching assistant orientation; the other speaker was the associate dean of the college. From 2003–2005, I was supported by a year long VIGRE fellowship and a year long university fellowship and subsequently did not teach. During that time, I met regularly with several undergraduates that I had previously taught and served as an academic mentor. In the fall of 2005, I taught a pre-calculus class with roughly 40 students and had an overall instructor rating of 5. In the spring of 2006, I was supported on my advisor's grant. The University of Texas school paper wrote an article about me because of my success in both the classroom and in research.

In part due to my high instructor ratings my first year of teaching at Texas, I was selected for a special program that aimed at increasing the retention of select groups of incoming undergraduates that traditionally had below average retention in comparison to the overall incoming class—as part of this program, I also received special training from the education department under the supervision of Brenda Fest. Aside from bi-weekly class meetings, I provided the students with academic mentoring, which aimed at providing the students with general strategies for success in college. In addition, focus was placed on increasing the confidence of the students on exams where, at least with regard to standardized exams, they did not previously meet expectations. This program was by far the most enjoyable classroom teaching experience I have had to date, in part because I felt that I made a difference in the college career of several of the students.

While at Caltech, I taught a graduate topics course on arithmetic lattices and an advanced undergraduate course on the geometry of curves and surfaces. My course on the geometry of curves and surfaces and I were the subject of an article in the school newspaper. The article was written by Jonathan Senn and said that despite being quite difficult, it was the best class he took at Caltech because every assignment, exam, and lecture made him think. Aside from the mentoring course work entails, I took all my students out to dinner using discretionary money given to me by the mathematics department as part of my position (this was later generously supplemented by Danny Calegari)—after the first dinner, the dinner parties were comprised of a maximum of six students and one special guest, typically a visiting mathematician. The dinners went a long way to bridging the gap between the students and myself, and enhanced classroom participation and collaboration among students. It should be mentioned that the idea of class dinners came while I was graduate student at the University of Texas. The renowned number theorist John Tate had his students over for dinner for each of the graduate classes he taught, and I remember feeling very special when I received his invitation. The "Tate dinners" inspired me to try this with my students.

Also while at Caltech, I advised David Rosen in a summer research project on arithmetic Fuchsian groups. Working with David was very rewarding and I feel we both benefitted from this relationship. It was my first experience at supervising research and I tried to follow my former Ph.D. supervisor Alan Reid's example (or at least how I perceived it from the advisee side). A part from a few rookie mistakes, the project was successful in its goal of introducing David to a few new areas of mathematics—one mistake was the difficulty of the project though we did make progress on the

problem. I also served as a mentor for David (Texas) and four other undergraduates (names and graduate schools: Sean Li (NYU), Michael White (UC San Diego), Ling Yang (Stanford CS), Josh Zahl (UCLA)) for the graduate school application process—this entailed writing letters, discussing departments, reading over application material, and having a dinner party to celebrate their success. Finally, I served on the Ph.D. candidacy committee for Vaibhav Gadre, and also as the mentor for James Berglund (UC San Diego) and Sukhada Fadnavis (Stanford) in their mathematical writing course MA 11.

While at the University of Chicago, I have continued my class dinner tradition for both of the classes that I have taught (undergraduate analysis and introduction to PDE) and found them to be even more successful in instigating classroom participation and collaboration. I have also taught five reading courses: Lucas Culler (elliptic operators on manifolds), Eugene Eyeson (analytic and algebraic number theory), and Alex Wright (Lie groups and algebraic groups). With Ben Schmidt, for the 2008 REU at Chicago, we gave four lectures on open problems in geometry, geometric group theory, and dynamics. These lectures preceded a series of lectures given by Benson Farb on free and surface groups. Being a problem oriented mathematician, I tried to convey my love for problems and felt our lectures were very successful; they were mentioned the following year in advertisement for the program. I also gave several lectures in the geometric literacy class run by Benson Farb on various topics including arithmetic lattices and mapping class groups.

Perhaps my biggest impact at Chicago has been in advising and mentoring graduate students. I am a co-advisor of Khalid Bou-Rabee with Benson Farb. Under our collective guidance, Bou-Rabee has authored four papers, two of which were in collaboration with me. Bou-Rabee will graduate in the spring of 2010 and is applying for an NSF postdoc under Terence Tao at UCLA. In working with Bou-Rabee, I have a much deeper appreciation for the role of an advisor and need to adapt my advising style to best serve the individual student. With this experience and having two wonderful advising models in Farb and Reid to follow as guides, I feel confident in advising students at a wide range of intellectual abilities—and hope to continue advising.

I have taken an active role in all aspects of the maturation process of Bou-Rabee and all the students I mentor, meeting with many of them at least once a week; students include Ian Biringer (NSF postdoc at Yale), Khalid Bou-Rabee (2010), Tom Church (2011), Spencer Dowdall (2012), Asaf Hadari (2011), Justin Malestein (postdoc at Temple), Tam Nguyen Phan (2011), Irine Peng (postdoc at Indiana), Justin Sinz (2010), Alex Wright (2013), and Tomasz Zamojski (2010). It has been truly a pleasure working with these students, even if it meant getting less work done per week. I hold the philosophy of being generous with my ideas and time for students and colleagues with high regard as I have been fortunate to have received such generosity throughout my academic career, starting with my research mentors in mathematics, physics, and poetry as an undergraduate.

In running seminars at both Caltech and the University of Chicago, I have hosted numerous mathematicians, some of which were advanced graduate students and recent Ph.D. recipients. During the 2006-2007 academic year at Caltech, I hosted 9 visitors and during the 2008-2009 academic year at Chicago, I hosted 17 visitors—these were the visitors that stayed at my home. The constant influx of ideas and energy generated by visitors has helped the students I mentor, in addition to providing them with important contacts and potential letter writers. Though quite demanding, this activity has been extremely gratifying from the perspective of promoting and supporting young mathematicians at and outside my home institute, and the *natural* collaborative environment it creates.

I hope to be able to continue to successfully divide my time between advising students, hosting research guests, conducting research, and teaching undergraduate and graduate classes as I feel each is equally as important in my duties as a mathematician.