Teaching Statement
Kasso A. Okoudjou

During the last decade I have had the opportunity to teach high school mathematics as well as a variety of undergraduate and graduate mathematics courses at higher education institutions. My experience with teaching began during my undergraduate years, when I tutored high school students in Benin, West Africa. After graduating, I taught high school mathematics for two years during which time, I was the lead instructor for Algebra, Trigonometry, and Geometry courses. During graduate school at the Georgia Institute of Technology I split my time between the roles of teaching assistant and instructor, having the good fortune to teach different undergraduate math courses with full responsibility. Most recently, I have been teaching various undergraduate and graduate mathematics courses at Cornell University. The least I can say is that I love and enjoy the teaching component of my profession as much as I love its research component. Moreover, at this early stage in my career, I have been fortunate to teach a broad range of courses including

- **Introduction to Linear Algebra**
- **Multi-variable Calculus**
- **Calculus for engineers**
- **Honors Calculus**
- **Engineering Mathematics (Differential equations)**
- **Introduction to Analysis**
- **Fourier Series and Wavelets**
- **Measure Theory and Lebesgue Integration**

As mentioned above I have taught mathematics at almost all levels of the education chain, and, hence, I have had students with various background. My experience as young mathematician has led me to value an interactive approach when teaching. This might seem a general statement that any teacher can make, but I believe that the cornerstone of my teaching is my ability to engage my students to interact and actively participate in my courses. In particular, when teaching any material, proving a certain theorem or working out an example, I always seek the input of my students. I believe that this technique leads the students to think ahead of what is written on the board and motivates them to be better prepared by reading and contemplating the material before class. This not only has the effect of making the class very interactive, but also of helping the students prepare their questions and

really understand what is being taught. Even when there is no immediate reaction to my question, I usually reformulate or relate it to material already covered and wait for a student to respond. Most of the time, ideas start coming from my students, and bite by bite, input from the class is put together to achieve the goal at hand. It takes sometime for the students to build up a confidence level that enables them to participate in classroom discussions, but by making sure to call on specific students if necessary, and encouraging them to share their opinion with the class, this usually becomes a routine as the term goes on. The relatively small size of most of the classes I have taught made it easier for me to develop and use this very interactive teaching technique. However, I have also taught a large lecture (about 100 students) and still manage to initiate a somewhat active participation of my students. While a small class size is always desirable, modern technology does make it possible to retain a high level of interaction with students in a large lecture format. In particular, I have used Blackboard (a web-resource instruction aid) to promote interaction and discuss about a course.

Though there is a difference between teaching a service course, a course for math majors, and a graduate course, I still find myself using essentially the same techniques with small adjustments for each course. Participation of my students is an important part of my teaching technique, as I pointed out above. Another teaching technique that I value is repetition which I strongly believe is the most important pedagogical tool a teacher can use. In particular, I repeat myself very often when trying to stress what is really important in a definition or trying to emphasize the finer points of a theorem. Repetition is especially beneficial when teaching lower-level undergraduate courses, where attendance and attention spans for math are less reliable.

At this early stage in my career, I have also had the opportunity to teach courses directly related to my research area: Harmonic Analysis. In particular, I taught during two different semesters an upper level course in Fourier Series and Wavelets. This gave me the opportunity to teach a quite advance material for mainly undergraduate students. The students in this course range from undergraduate math majors, with only multi-variable calculus under their belt, to engineering graduate students that generally are not overly familiar with rigorous mathematics. Motivating the material was relatively easy due to the widespread use of Fourier or wavelets

analysis in applications such as signal processing. Even so, I had to constantly balance my presentation, striving to keep the material accessible to the undergraduates while convincing my engineering component that the theoretical topics have impact in applications relevant to their work. I believe that I have achieved these goals, as I strongly feel that my students walked out of the course with a balanced amount of theoretical results about Fourier analysis as well as some applications of the theory. Moreover, as one of my roles as teacher is to infuse in my students a passion of mathematics, I always use the opportunity of teaching applied topics to stimulate the interest of the students in mathematics by making them aware of the constant and widespread use of mathematics in every day life.

In addition to my teaching duties at Cornell University, I have had the opportunity during the last two academic years to mentor undergraduate students participating in the Mathematical Modeling Contest. This is a world-wide contest held every year and in which teams of three undergraduate students choose one of three (real-life) ill-posed problems and propose mathematical models that best solve it. As a member of a two persons Committee on Mathematical Modeling Contest in the Department of Mathematics of Cornell University, I helped run an internal contest designed to choose the teams representing our University. In particular, we ran a series of seminars intended to present the process of modeling, to compare different models of various problems, as well as to point out the limitations of each of our models. The main message we try to covey to our students is the importance of starting the modeling process from very simple models before moving to more complicated ones while always keeping in mind that the proposed models have to be practical. Our effort has been rewarded last year, as one of the two teams representing Cornell University was awarded a Meritorious prize for its work.

Overall, I strongly believe that I have been successful with my teaching technique thus far in my young career. This is illustrated by the very positive teaching reviews I received over the years. In particular, I am extremely proud of the Junior Teaching Award that I received from the Department of Mathematics at Cornell University. I strongly believe that good students become better with great teaching. Therefore, I work every day to become a better teacher, and I look forward to teaching more courses in the future, as I continue to strive for excellence in teaching.