1 Teaching philosophy.

I feel I have been learning the art of teaching mathematics my whole life. My father, a mathematics professor, and my teachers, all in their own way inspired me with their love for the profession and taught me patience and joy of sharing knowledge.

Soren Kierkegaard once said that instruction begins when a teacher learns from the learner and puts himself in his place so that he could understand what he learns and the way he understands it. My seven year experience of teaching mathematics from introductory college algebra level to the level of advanced calculus, linear algebra and differential equations at Penn State and numerical analysis at Carnegie Mellon taught me to appreciate the wisdom of this saying.

I went a long way from the first time I entered an introductory college algebra classroom as a teacher in Penn State in 2000. I have taught mathematics to students of all levels and abilities, experimented with different techniques, taken a number of teaching courses to learn new trends and enhance my skills, was promoted to a Teaching Associate status and nominated for Outstanding Teaching Award, received Dean's Recognition for Excellence in teaching at Carnegie Mellon, and though I feel that my constant drive to excel has made me a much better teacher, I still have a long road ahead. Here are some of the ideas I have used throughout the years to make my teaching effective and enjoyable, both for me and my students.

More than any other subject, mathematics requires consistency and continuity of the learning process, which can only be achieved through complete understanding between a student and a teacher. That is why I always start preparing my lectures by thinking how I would have liked this material to be presented to me if I were a student, what questions may it raise and what alternative explanations can I offer. I came to believe that the presentation should vary depending on the audience. Putting a student in the focus of the learning process inevitably raises the standards for the work performed by an instructor, while adding excitement and opening new roads for experimentation.

One of the key factors playing a role in the learning process is the classroom atmosphere. I believe students tend to learn better and are more open to new ideas when they are surrounded by a friendly, learner-centered environment, where they feel apt and their opinion is valued. It is important that they feel comfortable to ask questions and are encouraged by the instructor to do so. It usually takes time and effort to create such an atmosphere, so aside from keeping a dialogue style of lectures, I like to get more familiar with the students by inviting them to my office to discuss their exams and keeping regular study sessions to guide them while they work on their assignments. Team projects that I have recently incorporated into my class curriculum also proved to be effective in helping class members familiarize themselves with the environment and provided challenge and motivation for more advanced students.

Motivation is another key ingredient to successful teaching. Mathematics can be really intimidating for some students, while others may find slow-paced classes boring, so there should be enough flexibility in the difficulty level allowing for a healthy balance. My goal has always been to remove the barriers constraining students' learning to let them get a feel for the beauty this science possesses. In my classes, I like to give lots of theoretical and practical examples. For instance, my engineering students liked the simple car suspension system model I used to explain damped vibrations and enjoyed exploring the notions of direction fields, step functions and Fourier transforms with the use of Matlab and Java applets. With humanities students, I often find myself using the collaborative learning approach and other classroom teaching techniques I have learned from the Schreyer Institute for Teaching Excelence Course in College Teaching I took at Penn State. For most students in the introductory math courses,

hands on collaborative learning is preferable to traditional blackboard lecturing style, since this method gives them an opportunity to learn mathematical concepts their own way, through experimentation and active interaction with the instuctor and their peers at the same time.

I also have a tradition of making handouts, lecture notes and homework solutions available to students and creating web-based learning environment, where I combine online assignments and class statistics with interesting out of class reading resources. Through continuous experimentation I discovered, however, that it is not the use of technology by itself, but rather a blend of traditional blackboard teaching together with innovative techniques that delivers best results. When working on my Teaching with Technology Portfolio, I gathered many examples of classroom presentations and other teaching resources and put together a more in-depth discussion of my views on advantages and difficulties of teaching with technology, which are available online at http://www.math.cmu.edu/~masha/twt. It turned out that the work that went into the process of forging this Portfolio played a very positive role in my personal growth as a teacher and helped me formulate the key aspects of my teaching philosophy that I've presented here.

To summarize, I believe that the art of teaching lies in recognizing the specifics of a group of learners and choosing the right approach and the right set of tools to make learning process effective. My task as a teacher of mathematics lies in serving as a source of knowledge, always open and responsive to the needs of each and every student in my class, and I hope my students will retain the taste for learning, questioning and discovering long after my course is over.

2 Courses taught.

Carnegie Mellon. As the primary course instructor at Carnegie Mellon, I was responsible for all aspects of course organization. I designed and implemented a new technology assisted strategy for the numerical methods course, supervised student projects and carried regular evening Matlab sessions to assist with computer assignments. Typical class size: 30 students. Average evaluation score: 4.5 on the scale from 1(poor) to 5(excellent).

- Fall 2006: 21-369(Junior level) - Numerical Mathematics and Computing. Methods for the computational solution of linear algebra systems, nonlinear equations, the interpolation and approximation of functions, differentiation and integration, and ordinary differential equations. Analysis of roundoff and discretization errors and programming techniques.

- Fall 2005: 21-369 - Numerical Mathematics and Computing.

Penn State. As a Graduate Teaching Associate at Penn State, I was responsible for conducting lectures, constructing exams and syllabi, supervising graders, assigning grades. I held regular study sessions and implemented novel collaborative learning strategies when teaching College Algebra and Differential equations courses. Typical class size: 40 students. Average evaluation score: 1.6 on the scale from 1(excellent) to 6(poor).

- Spring 2004: Math250 - Ordinary Differential Equations. First- and second-order equations; numerical methods; special functions; Laplace transform solutions; higher order equations.

- Fall 2002: Math251 - Ordinary and Partial Differential Equations. First- and second-order equations; special functions; Laplace transform solutions; higher order equations; Fourier series; partial differential equations.

- Spring 2002: Math251 - Ordinary and Partial Differential Equations.

- Fall 2001: Math231 - Calculus of Several Variables. Analytic geometry in space; partial differentiation and application.

- Summer 2001: Math21 - College Algebra I. Quadratic equations; equations in quadratic form; word problems, graphing; algebraic fractions; negative and rational exponents; radicals.

- Spring 2001: Math220 - Matrices. Systems of linear equations; matrix algebra; eigenvalues and eigenvectors; linear systems of differential equations.

- Fall 2000: Math22 - College Algebra II and Analytic Geometry. Relations, functions, graphs; polynomial, rational functions, graphs; word problems; nonlinear inequalities; inverse functions; exponential, logarithmic functions.

- Summer 2000: Math21 - College Algebra I.

- Spring 2000: Math22 - College Algebra II and Analytic Geometry.

3   Excerpts from anonymous student evaluations.

Math22, Spring 2000: "Ms. Emelianenko teaching style is very helpful in mastering the material. She is always prepared and goes over problems methodically/ constantly to ensure understanding. She is also available and very helpful after class/ during office hours. Outstanding job!"

Math22, Fall 2000: "The professor is very helpful, she explains everything clearly and she is very helpful when you go to her office. Her class preparation is very good. She is very motivated and is a great teacher."

Math220, Spring 2001: "Instructor is one of the finest I've ever seen. Her flexibility and encouragement to her students is very admirable."

Math251, Spring 2002: "Our instructor tries to explain everything so that all the class members understand. She always meets me in her office hours for help. This is my second semester in a row with this teacher and I think she does a great job."

Math251, Fall 2002: "Very good explanations, available to help when needed, always willing to provide review sessions. Makes sure students know the concepts, spends time making homework solution that was very useful when studying for quizzes/exams. Always prepared for class. An overall good instructor"; "Very helpful both in and out of class. Provided us with excellent notes to study from, was obviously concerned that we learn the material."

Math250, Spring 2004: "I thought that Professor Emelianenko was excellent. She was, by far, the best professor that I encountered up here at University Park, especially from Math Dept. She was always prepared, happy and eager to teach. She made me want to learn. She was always willing to help. I would like to nominate her for the teaching award b/c she deserves it more than anyone I can think of"; "AWESOME. Best PSU teacher I ever had"; "I don't normally like math and I somewhat struggle in it, and she made it seem easy and made me want to learn the material."

21-369, Fall 2005: "Great job keeping up with students feedback on a regular basis and adjusting the course pace accordingly."