

Statement of Teaching Interests

– Zhijun Qiao

As a mathematical physicist and an applied mathematician, I am very interested in contributing to the continual development of courses in the Mathematics Department and other related departments at our university. I am particularly interested in designing and assembling courses in a broad range of applied mathematics and mathematical physics, especially the mathematics of Ordinary Differential Equations, Partial Differential Equations, Calculus (pre-, medium, and advanced), Complex Analysis, Linear Algebras and Matrix Theory, College Algebra, Analytic Geometry, Trigonometry, Applied Mathematical Analysis, Nonlinear Integrable Systems, and Solitons Theory. I hope to teach courses in mathematical methods (including ordinary, partial and integral differential equations), in Lie algebra, applied analysis and mechanics, in applied mathematics and theoretical physics, and in the classical theories of nonlinear integrable systems and solitary wave equations at both the undergraduate and graduate levels. At the undergraduate level, the courses will be designed to be modern and multifaceted, incorporating the use of *Matlab*, and *Mathematica/Maple* software and emphasizing the various theoretical and applicational aspects of the physical subject equations. The courses also give some numeric solutions and the corresponding figures to be understood easily. I think it is advantageous to develop courses that introduce students to contemporary ideas without taking away from the rigor of the Mathematics curriculum. In the courses, there will be a focus on fundamental concepts that transcend the various disciplines of Mathematics and Physics such as conservation laws and Hamiltonian structures in the nonlinear sciences and peaked solitons in shallow water wave and related subjects. At the graduate level, I expect to organize special interest seminar courses that rely on external contributors and on a significant investment by the students. Depending on the course level, I will employ a comprehensive approach in evaluating students that utilizes a mix of assignments, written and oral tests, and directed research projects complete with reports and presentations. Additionally, I expect to mentor both undergraduate and graduate students in research efforts that will serve to expose students to the academic research environment early in their education.

Prior to my work at Los Alamos National Laboratory, I was a Alexander von Humboldt fellow. I conducted research and co-organized seminars with my host as well as learned how to apply the software: *Mathematica* and *Maple* to teaching. My experience working as a Humboldt fellow, which is a worldwide prestigious reputation, taught me how to organize a seminar effectively and how to communicate with my colleagues. So, I am eager to begin a regular teaching schedule paralleled with an exciting research program. I have several years teaching experience in applied mathematics and mathematical physics as well as organizing seminars at both the undergraduate and the graduate levels. The experience at different universities provided the teaching skills needed to be a successful university professor. Conducting tutorials, preparing assignments, assessing students' performances and developing course materials were elements of my experience. In Los Alamos National Laboratory, I also give the lectures and teach some courses for our summer students programs. I like teaching and working with students. *My extensive work with students at various levels of undergraduate and graduate study and my high regard for mentoring and instruction are aligned with the mission of our university, in particular, with our mathematics degree program.*

Undergraduate Courses I can teach

1. Calculus (Pre, Medium, and Advanced)
2. ODE
3. PDE
4. Matrix and Linear Algebra
5. Analytical Geometry
6. Trigonometry
7. Complex Analysis
8. College Algebra

Graduate Courses I can teach

1. Nonlinear PDE & ODE
2. Abstract Algebra
3. Differential Geometry
4. Soliton Theory
5. Integrable System
6. Applied Mathematical Analysis
7. MS Thesis Seminar
8. Ph D Thesis Seminar