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Teaching Statement

From my experience both as a student and as an instructor, I believe that a great learning experience can be achieved through intellectual discussion, communication, and understanding between the instructor and students. I have a strong passion for teaching, and I enjoy sharing my knowledge with students and also learning from students' insights. My teaching philosophy consists of inspiration for why, demonstration of how, and experimentation for what, and I elaborate them below.

As a teacher, the first and most challenging job is to motivate to students "the why". Not only why this theory or equation is important for the subject, but also why this knowledge or skill is useful for students' future careers. I think it is crucial to stimulate students' interest in the class topics by explaining why. Students who have a strong willingness to learn can overcome all barriers of the course and achieve success. In particular, I find it very effective to begin a class with examples close to their daily life and connect to the class topic. For example, when I served as an instructor for *Introduction to Materials Engineering* at The University of Texas at Austin, I was told that half of students in my class were from Aerospace Engineering. So I adjusted my teaching strategy correspondingly. When I gave my first lecture, I started with an introduction of materials selection for airplanes, which immediately attracted their interests and inspired their enthusiasm to get involved in my class. I would like to keep exploring other teaching methods to inspire students.

Second, demonstration tells students how an abstract concept can be understood or how a tough problem can be solved. I'd like to translate the abstract theories to interesting learning objectives through an interactive classroom experience. I think one very effective way to do this is to explain through analogies and examples and to facilitate an interactive explanation process. I am particularly interested in developing students' problem solving skills and critical thinking ability. For example, when I was teaching students the interpretation of phase diagram, I found a successful strategy to solve a difficult problem is to divide it into several steps: (1) identify phase presence, (2) determine phase composition, and (3) determine phase amount based on lever rule. In addition, I offered students more credits for a reasonable solution of a quiz problem rather than just a right answer. I think an important part of my future teaching will be to design a series of

class demonstrations that can effectively illustrate important concepts and enhance students' various skills.

Third, doing experiments is the most effective way to learn what the application of the theory is. I believe that the frustration and excitement of learning by doing experiments can greatly help students master the underlying knowledge. As a teacher, I'd like to make a connection between the class materials and the current research to help students understand better contemporary extensions of classical theory in the textbook. For example, the undergraduate course I taught is a lecture-based course, and the students also took a lab-based course in the meantime. I found that students were far more engaged when they can apply the abstract theory to real experiments. In the future, I hope to combine research with classroom teaching to help students see the value of rigorous academic research in a professional environment and provide useful guidance for their future careers. Furthermore, students build more self-confidence after accomplishing what they thought they were unable to achieve.

In addition, I care about minority students to succeed. Minority students are likely to encounter more problems in schools than mainstream students due to incomplete knowledge of minority students' learning and communication styles. It is necessary to get to know their individual needs and strengths and sharing their concerns. Also, it is very useful to tap into students' backgrounds to enhance learning.

My teaching interests include *Fundamentals of Physics, Solid State Physics, Semiconductor Materials and Processing,* etc. Furthermore, I plan to develop some new courses, such as *Nanoscale Energy Transport and Conversion, Advanced Energy Materials* and *Fundamentals of Crystal Growth and Design.* I am also open and happy to teach other related courses.