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STATEMENT OF PHILOSOPHY ON TEACHING AND LEARNING

Pedagogical Statement

A personal philosophy on teaching and learning is established on the foundation of learning as a student and teaching as an instructor. Based on my experience from both sides of the classroom, students successfully learn when they discover the understanding and ability to overcome new challenges. Instructors effectively teach when they provide the motivation, information, and environment that facilitate students to make their discovery.

Specifically for engineering, well-defined, hands-on, project-based experiences create the environment for discovery. These experiences teach students structured and detailed problem solving skills that allow them to ask and answer several questions: "What is the problem exactly?" "What is known?" "What is unknown?" "What information is available or needs to be acquired to solve for the unknowns from what is known?" And, most importantly, "Does the solution make sense?"

Guiding Principles

Influential instructors enabling my own discoveries have demonstrated several principles backed by years of higher education research. Shaped by their examples, my philosophy on teaching and learning is guided by the following principles:

- **Teachers support interactions with students to enhance their involvement**. I identify students by name and show interest in their educational and career goals. As an informal advisor, I share both my academic and industry experiences with students and inform them about potential career opportunities.
- **Teachers promote collaboration between students to broaden their understanding**. I encourage small group participation when working on assignments or preparing for exams. Much like a professional environment, I design course projects that involve collective team, rather than isolated individual, efforts.
- **Teachers inspire active participation from students to improve their retention**. I provide students the opportunity to investigate well-defined, real-life problems of interest to them. To retain what is learned and develop communication skills at the same time, I invite students to present their findings to the class.
- **Teachers provide prompt feedback to students to focus their learning**. I resolve the problem areas identified through results of class assignments and exams. From the very first day of class, I give students opportunities to reflect on what they already know and make suggestions for what is necessary to learn.

Experience & Interests

Given my background at the intersection of engineering and biology, I have the experience and ability to teach undergraduate and graduate courses in both Mechanical Engineering and Biomedical Engineering Departments that focus on kinematics, dynamics, numerical methods, anatomy and physiology for engineers, and biomechanics. As an engineer, I spent more than four years instructing cardiothoracic surgeons on the clinical application of a robotic system for minimally invasive surgery at various hospitals throughout the United States, Germany, Finland, China, and Japan. As a doctoral student, I was a guest lecturer for mechanical engineering courses, namely: Introduction to Numerical Methods, Biodynamics, Mechanics of the Human Locomotor System, and Analytical Dynamics. As a postdoctoral fellow, I assisted in the development and launch of a new bioengineering course entitled Physics-based Simulation of Biological Structures. Most recently, I was a guest lecturer for a mechanical engineering and bioengineering course entitled Biomechanics of Movement. In the future, I would be excited to teach core curriculum related to my background and expertise.

Course Development

I am eager to develop and teach new upper level undergraduate and graduate courses as well. These courses would complement the department's existing strengths and would contribute to the preparation of engineering students. I envision developing the following courses:

- *Biomechanics of Movement*. Lectures will cover experimental techniques to study human and animal movement, mechanical properties of muscle and tendon, and dynamic analyses of musculoskeletal systems. Students will complete homework, exams, and group projects presented in written form and orally.
- *Modeling and Simulation of Human Movement*. Lectures and student presentations of selected journal articles will cover concepts in musculoskeletal modeling, analyses, and simulations. In addition to article presentations, students will complete simulation laboratories and projects related to a clinical question.
- *Biomedical Device Design*. Lectures will cover the design process, regulatory issues, and intellectual property. Students will work in groups to design, prototype, analyze, and test devices for projects originating through collaboration with physicians and medical device companies.