

TEACHING PHILOSOPHY

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The most important objectives of teaching Mathematics must be to introduce the concepts and provide the students with the tools required to solve problems. Because learning is an active process, it is crucial that students develop interest and excitement about the subjects they are being taught. I believe one of the best ways of creating this excitement is to explain what *Unsolved Questions* were at the origin of a particular solution. This historical perspective will confront the students with science as a work in progress and as an ongoing challenge to discover principles and laws and apply them to practical situations. Also, both as a student and as a researcher I have learned that theoretical concepts are best consolidated by putting them to practice. It is only then that the value and significance of the theory can be truly grasped.

As a consequence, I believe that it is essential to have some flexibility in one's teaching methodology in order to adapt to the different learning styles of students. I use a variety of techniques in the classroom besides formal lectures, such as exercises in small groups and student presentations. I think that the classroom should provide a framework for students to develop their own particular interests and independent thinking. For example, students can take advantage of the wealth of Math-related material available online to complement and expand what they learn in the classroom.

During the last nine years I have been involved in teaching undergraduate students both individually and in groups. In all cases I was delighted at the interest and dedication of the students, who soon took the initiative and started working independently. Recently, I had the opportunity to supervise two highly motivated undergraduate students in my research group. For the last four months they have been learning signal processing and multi-resolution analysis techniques aimed at integrating scientific computing into several problems in medical imaging. In particular, Jean is learning advanced wavelet-based algorithms to assess and validate the use of magnetic resonance imaging (MRI) as a diagnostic tool, and to correlate progressive neurodegeneration along

various stages of epilepsy. From the very beginning he showed outstanding motivation and curiosity. He was continuously learning about methods and concepts far beyond those in his lectures, while he developed practical expertise in mathematical imaging applications. He would also challenge me to come up with practical solutions and good explanations for the results he was obtaining.

For the last three years of my graduate studies, I also offered both my experience as a Recitation Instructor and my coding abilities to aid Professor Bradley J. Lucier with his “Homework on the Web” project. The purpose of this project was to build an Internet-based system for generating and delivering individualized sets of homework problems to students in Math courses, featuring immediate feedback on the validity of their answers, and allowing them to correct their mistakes until answers were satisfactory. This project put me in direct contact with a heterogeneous group of both experienced instructors and hard-core computer programmers, all of them deeply involved in creating better devices to aid students further their knowledge in Mathematics.

I feel that my experiences with undergraduate students, veteran instructors and committed professionals have been very enjoyable and we all benefited from them—especially, the students. I have learned that even in practical situations it is crucial to explain the concepts behind the observations as the experiments progress, be it in the computer lab, in the classroom or working a complex computer project. I have also learned that it is especially important to be supportive of students whenever difficulties and frustration arise. I believe that in research, self-confidence and enthusiasm are as important as or even more important than knowledge of concepts and facts.

I would like my students to see me as an accessible, supportive person who respects them as individuals and is interested in their intellectual and personal development. I will always strive to communicate to them the excitement that is gaining new knowledge from day to day. Often it is the interaction between teacher and students that nurtures motivation and enthusiasm for science.

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