

Grégory Guisbiers, Ph.D.
Assistant Professor-Tenure Track

A. Teaching philosophy

Being born and raised in Belgium, I naturally studied there, precisely at the University of Mons. It is during my PhD that I got my first teaching experience as teaching assistant in elementary mathematics. After receiving my PhD from the University of Mons in Belgium, I continued my scientific research and personal development as a postdoctoral fellow in Europe (Portugal, France, Belgium) and later on as an assistant professor in the United States (UT San Antonio & UA Little Rock). In all of these places - Europe and North America - I was able to get a close look at how physics is taught at both the graduate and the undergraduate levels. This gave me a broad insight into the advantages and the disadvantages of different education systems and has helped me to shape my own approach to teaching physics.

My exposure to different educational systems has helped me better understand what it means to learn physics. Learning physics is a process which allows a person to comprehend the world not only intuitively but also quantitatively. To be successful in learning physics one must be able to translate concepts that one studies in experiments, textbooks, and lectures to the real world. In this way, physics is unlike most other disciplines, it enriches a person's everyday experience of the world by allowing not only a greater qualitative understanding but an ability to quantify everything. To encourage student learning my teaching philosophy is based on three main principles: **generating enthusiasm for physics, recognizing the uniqueness and the special needs of each student**, and, finally, **creating a basis for lifelong learning**.

Generating enthusiasm for physics is a prerequisite for successfully teaching a physics class. Only when students are fully engaged and personally interested in the material will they go beyond studying for the test. The most important tools to pique student interest are lecture demonstrations and experiments. A good example of an effective use of demonstrations in a general physics course that I try to emulate can be seen in the MIT OpenCourseWare Physics I lecture series taught by Walter Lewin and published on YouTube. For some topics, tabletop experiments are not feasible and in such cases I use videos, images, and animations of experiments as well as computer simulations. Another often overlooked tool for increasing student enthusiasm is to dedicate time to telling the compelling stories of the origin of physical concepts and the people who have contributed to their discoveries. This helps students relate to physics in a personal manner rather than seeing it simply as a collection of facts. Finally, I hope to help organize undergraduate physics research conferences and competitions. These conferences and competition will not only give students invaluable experience but will also broaden their social interactions.

Good teachers must also **recognize the uniqueness and the special needs of each student**. One must establish a good rapport with students and get to know them, not just by name, but about their everyday life experiences, cultural backgrounds, and personal goals. This allows me to develop custom teaching plans tailored to my students' background and interests. The main avenue for accomplishing all of this lies in office hours and in one-on-one consultations. One-on-one interactions give students confidence both in the teacher and in their own ability to succeed in the course. Working with

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students individually will also expose me to a broad spectrum of students and help me gauge the class level of enthusiasm and perception of physics.

Finally, the most important goal for a physics teacher should be **creating a basis for lifelong learning**. Physics is not simply a science, it is also a way of thinking. This is what has allowed many physicists to succeed not only in their own science but in disparate fields like engineering, biology, and even politics. Over the past few decades the pace of scientific and technological advancement has skyrocketed, which means that continuing quantitative learning is critical for both daily life and success in the workplace. The goal of lifelong learning can be achieved by encouraging creative problem solving. Questions such as “*why?*” and “*how?*” push students to go beyond simply memorizing the answers and instead develop independent thinking and analytical reasoning. One of my favorite things to say in class is: “*If you don’t have any questions, I have some for you*”.

I am a teacher who is totally involved with the class, dedicated to my students, and prepared to devote time and energy to them. I have succeeded as a teacher if my students have developed an attitude of inquiry that accompanies them for the rest of their lives, something that I believe is necessary to be a good professional and a good citizen.

B. Teaching interests

At the undergraduate level, I am particularly interested in teaching the fundamentals of physics (such as General Physics I and II or Principles of Physics I and II). At the graduate level, I am interested in teaching more advanced topics like Methods in Physics, Solid State Physics, Quantum Mechanics, or Statistical and Thermal Physics. Based on my own academic background and my careful study of the current course settings of the Texas Tech University, I could develop one new course:

- Nanophysics & Nanomaterials. This course should be of interest to physicists, chemists and engineers. It will introduce size and shape effects on material properties as well as the charts and selection methods of material properties. Reference: M. F. Ashby, P. J. Ferreira, D. L. Schodek, Nanomaterials, Nanotechnologies and Design, Butterworth-Heinemann (2009)

Finally, I believe that teaching is complementary to research and development. Indeed, the students’ own research will produce practical scientific products (scientific papers, posters, presentations), teaching students the process of exploring physics from start to finish. Indeed, students learn most when they have opportunities to undertake tasks similar to those carried out by professionals within a discipline. I am very excited about the opportunity to mentor undergraduate students and serve as both an advisor and a role model in their professional and intellectual development. Of course, beside the teaching load, I can also take part in different committees to help the department.