Past Experiences. During the Ph.D., I mentored five students as part of the Undergraduate Research Opportunities Program (UROP), I gave multiple lectures to undergraduate and graduate students, and I was the teaching assistant (TA) for the course Communication Systems & Networks. As a TA, I gave lectures, held office hours, offered exam review sessions, created a new MATLAB project, and assisted in the design of problem sets and exams. At the end of the term, I proposed to create a Radio Lab (Fig. 1) that would complement the theoretical lectures with hands-on experiments. With the support of my adviser, I selected the equipment, purchased sixteen teaching Software Defined Radios (SDRs), and designed a sequence of five experiments that closely follow the lectures. In the following terms, I had the unique opportunity of conducting the Radio Lab. For this work, I received the annual Graduate TA Award of 2018 from my department at MIT.

In the second year of the Ph.D., I completed the Kaufman Teaching Certificate Program from the Teaching & Learning Lab. This certificate program consists of a number of workshops designed to improve the participants teaching skills. Some of the topics were: Designing a Course and Constructing a Syllabus, Interactive Teaching & Active Learning, and Teaching Inclusively. During the S.M. in Brazil, I volunteered as a Math Teacher and gave weekly lectures for a talented class of underprivileged middle school students for two years.

Future Plans. My passion for research and teaching is what draws me into academia. I am looking forward to lecturing academic courses with a mix of theory and practice. My background in Electrical Engineering makes undergraduate courses on Circuit Analysis and Design, Dynamic Systems and Control, Signal Processing, Inference, and Machine Learning appealing to me. Graduate level courses on Communication, Networks, Probability and Optimization are also a great fit.

Teaching Philosophy

One of the most instructive exams I have ever taken was in Introduction to Thermodynamics. The exam had only one question: determine the temperature of equilibrium of a microchip that lies inside a PC and suggest a modification that would reduce its temperature. Surely, the instructor was not expecting us to optimize the design in a two-hour exam; neither was the instructor trying to assess if we remembered a minor detail mentioned during a class. The goal was to engage us in a (close to) real-life setting and to evaluate how well we could apply the core concepts learned throughout the course. Even though such an exam can be challenging to grade, I strongly believe that this type of thoughtful experience can facilitate learning.

Some factors that I think have a special role in promoting long-lasting learning:

a) planning the course around core learning objectives for the students;
b) designing the classes as to engage students and promote retention of knowledge;
c) acting on feedback from students and colleagues to improve my teaching.

Learning Objectives. “Our lessons, units, and courses should be logically inferred from the results sought”. This quote is from [1, Chapter 1] where the concept of Backward Design is discussed. The main idea behind Backward Design is to begin any teaching planning by defining clear learning objectives for the students. This methodology facilitates the prioritization of topics, allowing us to remove inessential material and invest more time on the core concepts that we want students to retain. I always apply this method when preparing talks and lectures, for it helps me to make clearer presentations and to focus on the pieces of information that I would like the audience to take away.

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1Prof. Ezio Castejon Garcia from ITA in Brazil.
**Engaged Students.** When carefully planned, expository lectures are very effective for presenting new concepts and information, especially in fundamental/theoretical courses. However, I believe that making an effort to diversify lectures and to introduce activities to engage students can have a positive impact on learning [2]. When designing lectures, I make sure to add at least one activity such as an in-class question or short demonstration. For a class on Quantization, I created a MATLAB demonstration in which I run a song through different quantizers and play the song for students to appreciate the effects of quantization. This demonstration is surprising for it shows that the song is distinguishable even when it is encoded using a single bit per audio sample. The engagement boost after the demonstration was evident and grabbed students’ attention for the key mathematical proofs that followed.

**Constructive Feedback.** Even the most well planned and executed course can be improved by feedback from students and colleagues. It is essential to carefully listen students’ feedback (What are their interests? Expectations? How to make lectures more engaging?) as well as seek feedback from colleagues (How do they teach? What are their thoughts on how you teach?). After the first instance of the Radio Lab a few students pointed out that the laboratory scripts were “too procedural”. In the following year, I rewrote the scripts replacing some step-by-step instructions by hints and adding more links between theory and practice. The students’ experience and feedback for the laboratory improved significantly. In fact, the third instance of the Radio Lab had no negative feedback.

I believe that it is important to continually look for ways of improving my teaching. From the experience in the teaching certificate program, I take more than the state-of-the-art in teaching methodologies, a key lesson was that there will always be plenty of room to improve as a teacher and I will only improve by actively seeking for feedback. I certainly welcome those learning opportunities in order to become a better teacher and researcher.

**References**
