

Many of the most rewarding experiences in my education and professional training are related to teaching. I have been fortunate to taste this activity in various flavors, from giving lectures to leading recitations and labs, from working with an entire class to guiding individual students, and from designing homework problems to writing textbooks. Also importantly, I have had the opportunity to experience the act of teaching both as a student and as an instructor, in two relatively diverse education systems: Romanian and American.

I started at the University of Bucharest, by being a teaching assistant for several undergraduate courses including *Introduction to Computer Science* and *Artificial Intelligence*. The materials I designed and used in the *Artificial Intelligence* course lead to the co-authorship of my first textbook¹. This is currently the University's standard textbook for the course, and due to the high demand it has already been re-edited! Also interestingly, many of my students in that class are now pursuing Ph.D. on AI related topics at top-ranked universities in United States.

At Carnegie Mellon University, I was a teaching assistant for the undergraduate *Algorithms* twice; the first time, the course was taught by Gary Miller and Danny Sleator, and the second time by Avrim Blum and Manuel Blum. In addition to being a complete experience (weekly sections, one-on-one office hours, and small team oral gradings), I had the great chance to observe and steal many "tricks of the trade" from awesome teachers. I have learned how seemingly complicated concepts can be clearly explained by stripping them down to essentials, and how a series of carefully chosen questions can both help students discover difficult answers and also nurture independent thinking.

My teaching experience was further enriched by teaching and guest-lecturing for graduate level courses. In Spring 2006, I gave guest lectures in the graduate *Machine Learning Theory* course taught by Avrim Blum, and in the following year we co-taught the course together. Avrim had taught this class for a few years, and already had a well developed body of lectures. However, the angle on learning theory that had been emphasized in the previous versions was on computational aspects of learning theory. I had the opportunity to enhance the existing curriculum by contributing with lectures covering the more statistical side of learning theory. The addition of new topics such as Support Vector Machines or modern Sample Complexity bounds, as well as of new learning paradigms (e.g, Active Learning), has resulted in our course being one of the few that provide a more complete view on Learning Theory². To me, the experience of co-teaching this class was unparalleled. Since Learning was the area of expertise of most students in the class, they were coming in very knowledgeable and very inquisitive. Moreover, our selection of topics helped them explore and apply modern machine learning techniques and ideas to their own research projects. More recently, I guest-lectured in another graduate course, *Foundations of Electronic Marketplaces* (taught by Tuomas Sandholm), where I have presented my own results on Combinatorial Auctions and on connections between Mechanism Design and Machine Learning.

Taking part actively in so many diverse forms of teaching helped me develop and consolidate a set of basic, but solid principles. I have learned that the most fundamental aspect of teaching is that it is a very personal human experience, for everyone involved. It is important for a teacher to try to know as much as possible about the people in front of her, and to avoid all temptations to regard them as mere targets of her message. I am a firm believer in tailoring the teaching strategy of each course, from the syllabus to the homework problems, to fit the people to whom that course is addressed. To give an example, the goal of an introductory course should be for the students to acquire new skills and develop basic techniques, which often involves a slow pace; for the teacher, the challenge is to explain the basic concepts so clearly that they can be effortlessly grasped and easily applied. On the other hand, in the case of an advanced course the goal is for the students to get used to exploring on their own the various topics of the field; the teacher's main job should then be to stimulate them by pointing out interesting directions, or by challenging them with hard homework problems. In my experience, whatever the level or the topic taught, adapting my plan to the needs of my students was the first step towards earning their attention and just as importantly, their respect. The second step was to prepare, prepare, and if time, prepare some more! Finally, it was very important to keep the students interested and motivated, which often involved using humor and fun homeworks or projects.

I am interested and feel qualified to teach classes in a variety of areas including: any undergraduate introductory computer science course; advanced undergraduate or graduate courses in machine learning, artificial intelligence, algorithmic game theory, algorithms, learning theory, and computer science theory in general.

Throughout my education, my advisors have served as important role models, guiding both my research style and direction. I have learned from them that a research advisor influences a student not only by exposing her to a wise selection of problems, but also more subtly by helping her to absorb the elements of a good research style, to develop a good taste in problems, and to forge collaborations. I am looking forward to the opportunity to do the same for my own graduate students.

¹ F. Hristea and M.-F. Balcan, *Issues of Search and Knowledge Representation in Artificial Intelligence*, University of Bucharest Publishing House, 2004.

²This version of the *Machine Learning Theory* course is currently listed as one of the research references on the *COLT Resources* webpage: <http://learningtheory.org/resources.html>
