Teaching Interests – Alin Dobra

My teaching philosophy has emerged from my experiences as a teaching assistant at Cornell University. I was responsible for grading homework/programming assignments and examinations, occasionally lecturing and holding regular office hours for the *Artificial Intelligence* (twice) and the *Machine Learning* courses, both senior level. Last Spring I was the instructor for the six-part project class *Practicum in Operating Systems*, class that complements and is taught concurrently with the *Operating Systems* class. My responsibilities included giving recitations, where I provided the necessary background and details for the project, grading the project and holding regular office hours. I offered, during the two days before each part of the project was due, to spent three hours in the laboratory where most students worked and help them overcome difficulties with both programming and understanding the operating systems concepts. The gratitude of the students made it all worthwhile. I realized then that I really like helping students understand and appreciate Computer Science and that, judging by their evaluations, I have the necessary qualities to be successful as an educator.

One of the main reasons I am attracted to the academic environment is the opportunity for personal interaction with students of diverse backgrounds and levels of knowledge. Teaching allows me to stimulate the students' interest in the subject and to get them interested in research. Providing research opportunities for advanced students would give them the extra challenges they need in order to stay motivated.

It is my firm belief that programming assignments and/or projects should be required in most Computer Science classes. By applying their newly acquired knowledge to solving realistic problems that require computer implementation, students not only improve their programming skills, but also develop a deeper understanding of the theoretical concepts. In my experience, augmenting systems classes like Databases and Operating Systems with projects, that should be mandatory for Computer Science majors, provides the biggest benefit for students. Best results are achieved by dividing large projects into smaller parts that can be spread thought the semester/quarter, and by requiring students to work in small groups.

Given my research and teaching experience I am qualified and I would enjoy teaching both undergraduate and graduate courses in Databases, Data-mining and Machine Learning as well as senior level undergraduate courses in Artificial Intelligence and Operating Systems, together with all lower level Computer Science courses. In addition to these courses I would like to design two advanced graduate classes, in the form of either a regular class or a seminar, on the following two subjects:

- **Approximate Query Processing**. This class will focus on approximation techniques for query processing like sampling, histograms, wavelets, sketches with an emphasis on data streaming algorithms.

- **Data-mining.** The focus of this class will be the scalable construction of classification and regression trees, frequent itemsets, clustering, timeseries analysis. It will also explore connections of Data-mining with Machine Learning and Statistics.

The material, in both these classes, will be covered by papers, classic and recent, and students will be asked to work on research projects that attack open problems. The opportunity to teach such classes would allow me to expose students to my line of research and would certainly facilitate further collaboration.