Teaching Statement

I have always been interested in sharing my knowledge and experience with others. The unique combination of teaching and research is one of the reasons for me to pursue an academic career. I believe transferring knowledge is as important as discovering it. This ensures its usefulness and longevity.

Today, computing is an indispensable part of modern human life and it is everywhere. It is only getting more pervasive and ubiquitous. The next generation computer scientists and engineers will need to work on more and more diverse applications. I believe I am in a position to provide a unique perspective to the students about computing that is outside the traditional computers (PCs, servers etc.). I have taken a large number of classes from various departments that span a wide variety of subjects and I have gained a multidisciplinary perspective on teaching. Moreover, my own research is highly interdisciplinary and requires computation on many levels, from user-interfaces to high-level architectures to embedded computation. In my teaching, I will convey a breadth of possible application areas of the subject matter and assign exercises, homework and projects that will cover this breadth.

I think the students learn best when they can apply their knowledge in a creative way. Homeworks are essential part of any class but they usually do not go far enough in terms of applying the learned knowledge. I am a strong supporter of class projects where students can be creative. A valuable experience I gained from studying at Georgia Institute of Technology was that the emphasis placed on interactive class projects. I have a conference publication that came out of a class project which is not in my primary field of research. I gave three guest lectures during my time at Georgia Institute of Technology. In Spring 2012, I prepared a lecture for the graduate level course on Artificial Intelligence about the RRT* algorithm and heuristics to speed up its convergence. I created visuals to highlight how it differs from the RRT algorithm that the students learned about in the previous classes and explained the intuition behind its optimality. In Spring 2013, I prepared a similar lecture for the graduate level course Robot Intelligence: Planning in Action, but went into more detail since the class had deeper knowledge about motion planning algorithms and the course was more focused on these than the AI course. Finally, in Spring 2014 I gave a guest lecture in the graduate level course Interactive Robot Learning about user-studies for skill learning, keyframes and goal learning. I described both the interaction and the algorithmic aspects; having non-experts as the source of data for learning algorithms. In all cases, I adjusted my lectures for the syllabus and tailored my presentation for the students taking the class.

In addition to teaching classes I enjoy working with and mentoring students. I had the opportunity to work with several undergraduate and junior graduate students, which resulted in complete research projects outside of my thesis work. For example, I worked with a senior undergraduate student, Andrey Kurenkov, who was one of the Presidents Undergrad Research Awardees. I mentored him in running his very first robot experiment, which resulted in a conference paper submitted to one of the top robotics conferences, IROS 2015. I have also worked with PhD students that resulted in research paper submissions. I have transferred the knowledge I gained in conducting user-studies for learning from demonstration in the form of a generic protocol to these students. Being able to mentor students is another major reason I want to pursue an academic career.

I feel confident that I can teach undergraduate and graduate courses in the following fields: Artificial Intelligence, Robotics/Autonomous Systems, Machine Learning and Controls. I can also teach Numerical Computation, Embedded Systems, Introduction to Programming and Engineering Mathematics to undergraduate students. I am also interested in offering a robotics projects class that will give students hands on experience in integrating algorithms, robots and sensors and on debugging complex systems. In addition I look forward to developing the following new courses:

- Human-Robot Interaction: This class is within my main research area. I want students to learn the broad area of HRI and current state-of-the-art with special emphasis on algorithms and systems to enable realistic HRI. The students will also learn about research methods and statistical tools to analyze
HRI. The class will include a semester long group project that will involve a human-robot interaction study and weekly readings and discussion.

- **Agent-based Learning**: The main purpose of this course is to motivate the students to look at complex machine learning software from the agent perspective. This class will include 3 projects that span several agent types in addition to student presentations of the existing literature. As such, this class will partially be guided by the student interests. The three emphases of this course would be on model learning, reinforcement learning and learning from observations. Some example applications span robotics, video game characters and ad-placement in websites.