

Teaching Statement

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"I try to assert in my words and works that education has its only meaning and object in freedom – freedom from ignorance about the laws of the universe, and freedom from passion and prejudice in our communication with the human world."
(Rabindranath Tagore)

I grew up in an environment where pursuit and dissemination of knowledge were held in high regard. Over the last ten years, I had the opportunity to learn Statistics from some great professors at both Purdue University and Indian Statistical Institute, whose teaching helped me in many ways on my path to become a researcher and teacher. My teaching philosophy, as I describe below, has been motivated by these great teachers and the students I have taught or mentored in the last few years. I start with my experience as an instructor at Purdue University and summarize my teaching philosophy as well as suggest a few courses that I can teach comfortably.

Teaching experience in Statistics

Undergraduate Statistics Courses I was a teaching assistant for two undergraduate courses in Statistics, Stat 113, 'Statistics for Society' and Stat 301, 'Introduction to Statistics' in 2011 and have taught the latter course as a full instructor in Summer 2014. These two courses were aimed at undergraduate students across all majors. As a T.A., my responsibilities included holding the lab session for six sections every week, grading the labs and homeworks. The primary objective of the lab sessions were to review the concepts covered in the classroom. This was done by helping students understand the concepts either by manual calculation or using the statistical software SPSS. These sessions were designed to be highly interactive and the students were actively encouraged to ask questions. Teaching lab sessions to three different sections per course, spanning six hours every week, significantly contributed to improving my presentation and communication skills. This experience helped me a lot in my duty as an instructor for Stat 301, where I also held recitations along with lab sessions. I designed the recitations in a way to incorporate interesting examples and anecdotes of using Statistics in many diverse disciplines, to help the students from different backgrounds appreciate the need of learning the basic data analysis skills. I received very good evaluations from the students from all the sections I have taught - a sample teaching evaluation for STAT 301, fall 2011 is available on my website (<http://www.stat.purdue.edu/jdatta/teaching.html>).

Graduate Statistics/Machine Learning Courses I have been the lab instructor for two advanced graduate level courses, 'Introduction to Computing for Statisticians', Stat 598Z and its sequel Stat 598G, over three semesters (spring 2012 to spring 2013). The basic objective of Stat 598Z was to introduce basic machine learning and computing concepts to students, majority of whom did not have any prior expertise in computation or programming. My responsibilities included conducting the lab session and grading the homeworks and the course projects. I believe that good programming requires one to organize their knowledge based on the underlying algorithm and use both general and specialized problem solving strategies. To put these ideas into action, I emphasized the role of understanding algorithm complexity and tried to inculcate the habit of thinking algorithmically into the students. These efforts proved to be useful when the students were exposed to more advanced topics later in the semester. At the end of the semester, I found the students not only well versed with Python and the art of debugging, I felt content when the students started applying their skills to solve their own research questions. The advanced computing course, Stat 598G, though similar in structure had a different audience and objective. Since the majority of students enrolled had some exposure to a programming language before, the lab was designed as a separate 1-credit course. My responsibility was to design and conduct the labs to supplement the materials covered in class, grade the programming homeworks as well as the course projects. As a part of the curriculum, the students were exposed in-depth discussions about advanced topics such as hidden markov models.

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Teaching Philosophy

Almost all the courses that I have taught at Purdue catered to a diverse audience. For example, in the graduate courses there were students majoring in computational biology or applied mathematics who wanted to learn Python/C as a programming tool for solving problems arising in their field. In order to know the backgrounds of my students, I would always ask the students to answer a simple survey about their background and expectation from the course. During the first class, I also clearly explain the prerequisites of the class and what I expect from the students over the semester.

As an instructor, I believe in preparing well ahead of the class and providing the students with resources that they need throughout the course. I also talk with colleagues who have taught similar courses in the past, and learn from their experiences. I have felt that good illustrative examples are immensely useful for all Statistics courses and I choose my examples that are relevant to the students. I encourage students to think about the applicability of the methods to their own research. To engage the students during the lab and to develop a fast problem solving approach, I use bonus questions in addition to the regular practice problems. In my experience, these small incentives have proved to be a huge success among the students. While designing the labs for the computational Statistics courses, I paid particular attention to the contents so that they appeal to both the beginner and expert programmer students. In all my lab courses, bonus questions were assigned to randomly created groups of students in each lab that required brainstorming and sharing ideas. The result was an extremely interactive and collaborative classroom environment that fostered creativity among my students. Finally, I think a well-designed course project helps the students develop their problem solving abilities. In my experience as a teacher, a project helps students to think through a complete practical problem, and prepares them for future career.

I consider it my strength that I am able to positively assimilate the feedback received from my students to improve my teaching. I make it a point to read through all the comments that students leave for me in their evaluations. For undergraduate courses that are interdisciplinary and open to students of varying backgrounds, it is my responsibility to communicate materials effectively to those who struggle with difficult concepts taught in the class.

Proposed Teaching

I consider myself well-suited for teaching all undergraduate and most graduate level courses in Statistics. However, for graduate level courses, I believe I will be most comfortable in teaching courses in machine learning, statistical methodology and theory, applied Statistics as well as probability and stochastic processes. I have gained substantial expertise in many areas of applied Statistics, such as design of experiments, statistical quality control and multivariate analysis, through six semesters of working with the statistical consulting services at Purdue. I have a strong background in Bioinformatics and human genetics through advanced master's level courses at Indian Statistical Institute and collaborative projects with expert geneticists at Duke - which makes me well equipped to teach an interdisciplinary class on the use of Statistics in various biological applications. A list of the courses that I have been a teaching assistant for is provided below. For a teaching reference, please contact Prof. S. V. N. Vishwanathan (contact information under the teaching references section in my curriculum vitae).

Table 1: List of Teaching Responsibilities. (G): Graduate, (UG): Undergraduate. (TA): Teaching Assistant, (LI): Lab Instructor, (FI): Full Instructor

Semester	Course Number	Course Title
Fall 2010	CS 471 (UG, TA)	Artificial Intelligence
Spring 2011	Stat 301 and Stat 113 (UG, TA, LI)	Introduction to Statistics, Statistics for Society
Fall 2011	Stat 301 (UG, TA, LI)	Introduction to Statistics
Spring 2012	Stat 598Z (G, TA, LI)	Introduction to Computing for Statisticians
Fall 2012	Stat 598G (G, TA, LI)	Introduction to Computational Statistics
Spring 2013	Stat 598Z (G, TA, LI)	Introduction to Computing for Statisticians
Summer 2014	Stat 301 (UG, FI)	Introduction to Statistics