

Christopher Lee Simpkins

Teaching Statement

The essence of great teaching is a clear explanation, activity or intervention that is designed to meet each student's individual needs. Without clarity, any educational "innovation" is merely a gimmick, so I spend a great deal of time thinking about the best way to explain difficult topics, the order in which they should be taught, and the key points every student needs to master. Most importantly, I listen keenly to my students to try to diagnose the errors in their mental models so that I can give them exactly what they need. Teaching and learning is fundamentally a conversation between human beings, and sensitivity to student needs is key. In three years of teaching mechanics to Air Force space students, three years of teaching Air Force student pilots how to fly, and eight years of teaching undergraduate and graduate courses at Southern Polytechnic State University and Georgia Tech my students have achieved excellent outcomes and my teaching has consistently been rated well above comparable averages. For example, in the four recent semesters for which statistics are available, my median CIOS teacher effectiveness score is 4.41 in each semester compared to an average of 4.1-4.2 for similar courses. Students seek me out at graduation to tell me that I'm the best professor they had, or that I "inspire students to the world of computer science." Longitudinal success is particularly important to me, that is, preparing students for the courses and professional practice that follow my courses, so I am particularly gratified to receive regular communication from former students thanking me for preparing them well. Former students often report that they are "star performers" on their teams thanks to the preparation they received in my courses, for example "the other interns had been there for years, but I was better at Java than they were after taking your course!". I frequently speak with instructors of follow-on courses to gauge the preparedness of graduates of my courses. Every semester I consider the feedback of these instructors and the comments of students in CIOS comments, my teaching assistants, and student discussions to adjust my teaching methods. While it is our responsibility as experts in our fields to decide *what* to teach our students, our students have invaluable advice on *how* we should teach. I have altered the content of my lectures, their pace, and the teaching techniques I employ in response to feedback. I have tried various forms of active learning, including group activities, in-class exercises, and for-credit short quizzes. I have found that most students respond best to short, clear explanations of key concepts followed by guided problem-solving sessions where I present a problem and engage them to think through its solution while I incrementally solve it and relate my own thought process. Lecture time is precious. I strive to infect my students with my own enthusiasm for the subject matter and wring every bit of value I can from every minute I have with my students.

A good teacher loves his students at least as much as he loves his subject, and that love should be evident. I tell my students that I view them as a cross between my own children and my junior colleagues to express the extent to which I care about their well-being, and the professional respect I accord them. I tell them how everyone, regardless of who they are, have a place at this university no matter their gender, race, sexual orientation, skin color or nationality. Everyone is welcome and everyone can find a group of friends. It can be hard to realize that fact for a kid who is away from home for the first time, especially if they feel that they are somehow "different." College is hard enough without such worries. Indeed today's students, perhaps more than when I was an undergraduate, deal with a tremendous amount of pressure – first to gain admission to an elite school, then to succeed there. This pressure takes a toll. Each semester I keep my finger on the pulse of the students to sense when they're hurting the most – when I hear more students crying in bathroom stalls, see more emails asking for non-academic help, less enthusiasm in my lectures. At

this point I reserve time at the beginning of a lecture to talk to my students about the importance of self-care and mental health. I tell them about all the services available through the university, I tell them that they are in this together and they should look after each other, and I tell them I have been there myself. I relate enough of my personal experience to let them know that personal crises can happen to anyone – even their professors. I affirm that they are worthy, that we care, and that it gets better. It is not easy to do this, but countless students have thanked me for opening up to them in this way and I believe I have made a positive difference in many of their lives. Relating my personal story is far more compelling than a simple advertisement for mental health services, and I want them to get the message. We are here for more than calculus and engineering and computing. We are part of something bigger, a family that stretches across the campus and the years. We are here to grow together, and to form bonds that last a life time. To do that we must take care of each other.

A good teacher is a subject matter expert. We cannot forget that we are at an elite institution and our students demand the best, most current material. I spend a great deal of time keeping abreast of developments in the field. I read voraciously, I learn new programming languages and theoretical frameworks, I speak with leaders in software companies and research labs. I have on occasion taken a summer off from teaching to work in industry so that I can bring the latest developments to my students from first-hand experience. When appropriate, I update my course material to reflect these changes. As an example, I update my Introduction to Object-Oriented Programming in Java course to use the latest JDK so students do not feel like they are being taught stale information. While it is important not to chase the latest “technologies du jour” I have come to realize that a hard distinction between theory and practice is a failure of imagination, a false dichotomy. In our field, at the undergraduate level at least, theory is best taught in the context of practical problem solving. The key is to communicate exactly what the theory is and how it applies to a given class of problems. Carefully teaching this way equips students with conceptual frameworks into which they can assimilate new knowledge. This approach enables them to become proficient problem solvers and lifelong learners. In the modern age the most important determinant of continued success is adaptability. I strive to develop this adaptability in my students in a fundamental way.

For years computer science educators have extolled the virtues of computer science education for all. In initiatives from Computational Thinking to Contextual Computing we have tried to convince people that computer science is as fundamental an intellectual and practical skill as mathematics. While I believe this claim has always been true, modern times have provided a compelling motivating problem: massive amounts of data, and the desire to make use of that data. For the past three years I have been deeply involved in updating existing courses like CS2 for Industrial Engineering with data analytics material and creating new educational programs and courses. I have worked with the leaders of the MS in Analytics program and the MS in Quantitative and Computational Finance program to develop workshops and bootcamps to equip their incoming students with the basic computational skills necessary to succeed in their programs. Last year I began working with leaders in the CoC to develop a new course in computational foundations for data analytics for CS majors. This CS majors course has already been offered as a special topics course twice and is intended to become a regular course that fulfills requirements in appropriate CS threads at Georgia Tech.

The core mission of a university is “science and *education* in the public interest.” Education must stand equally with research. I love research, but I do not allow teaching to take a back seat. I put as much effort and passion into my teaching as I do my research, and I derive as much satisfaction from it.