I was exhilarated after my first office hour when I helped a student perceive the significance of smartphone security, decompose her homework into rudimentary tasks and then watched her come up with her own solution. My ultimate goal as an instructor, is to motivate students to become self-learners and to nurture the development of their problem solving and critical thinking skills. I focus on knowledge discovery by learners facilitated through a hybrid approach of direct instruction on first principles and problem-based learning.

Motivation plays a pivotal role in students' academic success. I recollect having a long discussion with a Ph.D. student who was considering dropping out. I tried to help her identify what she wanted to do and analyzed why and how I thought she could succeed in the program. I am jubilant that now the student is thriving and will soon be graduating with a Ph.D.. Motivation also affects what learners pay attention to and how effectively they process it (Pugh & Bergin, 2006). Being aware of this, in my lectures for the *Computer Security II* and *Advanced Computer Security* classes at Illinois, I always dedicate time to highlight the importance of the subject at hand and illustrate real-world vulnerabilities and their severe implications. Moreover, I believe incentives can be catalysts in galvanizing students into supererogation, which we witnessed when we introduced prizes for the best solutions to a programming assignment.

Traditional direct instruction is conducive to the effective transfer of fundamental concepts to learners, while reasoning from first principles cultivates knowledge discovery. Hence, I will design my courses around lectures on first principles. Cognitive constructivism suggests that learning is realized when new is linked with existing knowledge (Anderson 1983). In my lectures, I follow a top-down approach to facilitate learners constructing such relationships. For example, when discussing smartphone side-channel attacks, I display video demonstrations from a user's perspective before explaining the attacks' internals. Furthermore, because students can be reading/writing, auditory or visual learners, I use multiple modes of delivery during the lecture, assisted by a combination of text, images, animations and videos, and I provide the students with readily accessible material. Also, evidence suggests that immediate use of information and teaching others increase retention rates from 5% attained during a lecture to 90% (National Training Labs, 1960). I plan to use after-class quizzes distributed through online course management systems (e.g. Moodle, Relate), and online Q&A services (e.g. Piazza) where students can ask and answer questions even anonymously.

As Albert Einstein said *"Intellectual growth should commence at birth and cease only at death"*. In a microscopic interpetation of this insightful quote, students should be trained to seek the latest developments, especially in a rapidly evolving field such as in computer science and engineering. Towards this end, I complement my course material with state-of-the-art research findings. Moreover, I update the analogies and examples I use in class based on current widespread real-world incidents or products, or suggestions by my students: a reasoned rumination of mobile security should encompass the latest security enhancements on Android and iOS ($> 95\%$ of mobile OS marketshare); a current discourse on denial of service (DoS) attacks cannot omit the Mirai-based botnet that precipitated the failure of a critical domain name server.

While direct instruction can be effective, I am an avid advocate of a hybrid approach in which direct instruction is coupled with problem-based learning (PBL). PBL is a discovery-based learning method, which increases learners' abilities in problem solving (Gijbels et al., 2005). I want to integrate PBL through (a) machine/implementation problems which require interaction with real-world technologies and (b) research/entrepreneurial course projects. In such assignments, extraneous cognitive load on learners can hinder retention of new knowledge (Sweller et al., 1998). To mitigate this, I use scaffolding techniques, such as providing instruction guidance or handouts. I have designed such handouts for assignments in *Computer Security II*, which aided students to distill an overarching problem into milestones but were also featuring an open-ended sub-problem where students could collaborate in small groups and come up with their own innovative solutions. Assessment was based on submitted reports, live demos and oral examinations.

In summary, I believe that student motivation is paramount to successful learning. At the same time I am eager to combine direct instruction of first principles with problem-based learning methodologies to foster the development of problem solving and critical thinking skills which will enable computer science and engineering students to become independent life-long learners and inventors of innovative solutions.