Viet Tung Hoang

# Teaching Statement

My teaching approach. During my eight years at FSU, I have taught courses in cryptography, algorithms, and analytic methods. I embrace the pedagogic philosophy that learning should be and can be fun. For example, the curriculum of my courses contain (1) unorthodox applications of cryptography such as using a deck of cards for a dating problem, (2) some interactive games as an exercise for learning dynamic programming algorithms, and (3) re-enacting Sherlock Holmes' code breaking in "The Adventure of the Dancing Men" via modern methods of cracking substitution ciphers. These activities dispel the myth that theory classes are boring, and inspire many students to develop an interest in the theory side of computer science.

While one important goal is still to help students get the course material and ace the exams, I believe one should go beyond that, because students will soon forget whatever they learn. What I aim for is to let my students absorb the material at such a level that they know how to rediscover it later. In other words, I want my students to *learn*, not to be *taught*. To achieve that ambitious end, using Pólya's heuristics in his famous books "Mathematical Discovery", I reverse-engineered the discovery process of some classic algorithm results, and amazed students with these behind-the-scenes pictures. I demonstrated to students how one uses plausible reasoning to form a blueprint of a proof, which may involve a lot of trial-and-error, and how to refine it into a polished, rigorous proof. Based on this material, I created an original problem-solving course that has received lots of positive feedback from students. Teams from this class won top places in the FSU ACM Programming Contest in Fall 2022. I also used the material of this class to coach an FSU ACM team in Spring 2024, and they won the second place in the ICPC Regional Contest.

Inclusive teaching. To provide an inclusive classroom, I strive to remember all students by name, and make sure that I pronounce them correctly by checking with students and using tools such as NameCoach. I ask students to work in pairs during class discussions and homework, assign students to groups randomly, and rotate the group members often to ensure that there is no self-segregation and no students are "last chosen". This practice significantly increases the class rapport and improves the learning.

To improve the accessibility of my course material, I frequently use metaphors to explain abstract concepts better, and provide alternative geometric views. This is crucial for visual learners, but it also helps other students to capture the big pictures instead of getting lost in the details of formalism.

With the help from the FSU Office of Distance Learning, I use weekly feedback forms and a very detailed mid-semester survey to timely adjust the class in response to student feedback. After each lecture and office hour, I also reflect on what I could have done better based on the interaction with students, and write that down in a teaching note. In preparation for each semester, I review the notes of prior classes, and polish the material or delivery approach accordingly. With this continual push for improvement, my teaching skill has become remarkably better over the years. In the last few years, I have received many thank-you letters from students (several from the underrepresented groups) for my teaching and caring.

Teaching in the time of pandemic. At the beginning of COVID time, I did not have much success with online teaching. It was much harder to engage students in an online environment, the board work—a big part of my teaching—was frustrating in Zoom, and in-class exams were prone to cheating. This failure forced me to earnestly re-examine my teaching methodology. As a result, I have re-designed my teaching material to place stronger emphasis on class participation, and to give students more opportunities to actively discover the knowledge under my guidance. Classes are now chaotic with

lots of questions and feedback, and it takes much longer to complete a topic than my past lectures. But this interaction exposes confusion and holes in students' knowledge, keeps them attentive during lectures, and results in a better grasp of the material. I also use oral exams for evaluation, which is time consuming but proves to be very effective in (1) ascertaining students' level of understanding, and (2) motivating students to study harder, seeking to digest the material instead of rote memorization. Despite the online learning and the intimidating oral exams, my teaching evaluation actually improves during COVID time. For example, in the undergraduate cryptography class that I taught online during Spring 2021, every student gave me an Excellent rating. Student feedback indicates that they enjoyed the interactive nature of the class, and found my teaching approach engaging.

ADVISING. Believing that less is more, I work with a small number of students so that I can advise them intently. My Ph.D. student, Cong Wu, had a paper at a top security venue (Usenix Security) that won the Distinguished Paper Award, and two other papers in good system conferences (IEEE Cluster and IPDPS). He is now a research engineer at Ansys Corporation.

From 2/2019 to 2/2020, I hosted and advised a visiting Ph.D. student (Yaobin Shen) from Shanghai Jiaotong University. Our collaboration resulted in two papers at top venues of security and cryptography (CRYPTO and CCS), and provided ideas for Yaobin to produce another CRYPTO paper. This achievement helped him to secure a postdoc position at the Catholic University of Louvain. Yaobin is now an assistant professor at Xiamen University.

I also unofficially mentored some students in underrepresented groups. From 8/2018 to 3/2019, I worked with a Hispanic student (David Miller) to publish a paper at a top cryptography venue. This success inspired David to pursue a Ph.D. program in the University of Utah. From 10/2017 to 4/2019, I mentored Ni Trieu, a female Ph.D. student from Oregon State University. Our work broke a NIST standard, yielding two papers at top cryptography venues. Ni is now an assistant professor at Arizona State University.