Teaching Statement: Clayton Thomas

Teaching has always brought me energy, and I am enthusiastic about this aspect of my career going forward. In both research and teaching, I greatly value exposition, precision, and properly conveying the high-level message. I am a theoretical computer scientist studying algorithmic mechanism and market design. I am confident I can teach standard computer science courses (and virtually any theoretical topic) at the pre-Ph.D. level. At the Ph.D. level, I would love to teach unique modern courses on economic design and connections to areas such as communication complexity and combinatorial optimization.

Specific themes in teaching I am interested in include:

- **Teaching students to ask the right questions.** I believe one compelling way to help teach this skill is with deep and exploratory case-studies illustrating the material (possibly serving as a the foundations of a higher-level corse, or a highlight of some of the more important topics in lower-level corse.

- **Developing quality, cohesive lecture notes.** While textbooks have their place, in my experience they are often unapproachable for students due to their length and generality. I wish to craft quality self-contained notes for students (and I believe this synergistically fuels good research by working to perfect the foundations of a field).

- **Presenting material in a variety of different ways, including "teaching through exercises."** I believe many courses would benefit from "warm-up" exercises, which are never graded, but which illustrate or teach the material of the lectures through a set of (mostly very easy and incremental) questions. I believe this approach—and complementary presentations such as illustrations and bullet-pointing text—is beneficial for diverse learning styles.

- **Courses on "economics and computation."** I also believe the fields of theoretical computer science and economic design are an ideal topic for a theory- and case-study-heavy course for graduate students or advanced undergrads. I was a teaching assistant for the highly popular Princeton course Economics and Computation, taught by my advisor Matt Weinberg, with consistent enrollment of over 200 students.[1] I would be thrilled to develop an analogous course.

My experiences with and approach to mentoring include:

- I have intensively mentored a number of junior researchers through joint research projects. From my time at Princeton, this includes Aadityan Ganesh (Princeton CS PhD student) and Ezra Edelman (then a Princeton CS undergrad). At Microsoft Research (MSR), this includes Ruqing Xu (MSR intern, Cornell Econ PhD student), Joey Feffer (MSR intern, Stanford GSB PhD student), and Kiran Dwivedi (MSR pre-doctoral research assistant).

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[1]My teaching experience also includes being a teaching assistant for an introductory theoretical computer science course at Princeton, and two semesters of a similar course at my undergrad.

- **Exploratory project development, coupled with systematic research.** I believe that good research skills are honed through technical papers that expand or clarify prior work, but that the most exciting research is born from long creative exploration. This is how we came up with the idea for my largest research agenda thus far (on strategyproofness-exposing mechanism descriptions)—long exploratory collaboration with my mentor Yannai Gonczarowski, touching on many diverse topics with the motivation of explaining strategyproofness before settling in on our specific framework.