Teaching Statement
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1 Introduction
I share the belief of many that the practice of teaching is an essential part of the research enterprise.

I further believe that it encompasses several goals, besides the obvious one of passing on concrete knowledge: evaluation of understanding, cultivating useful habits of rigorous thought and clear expression, and providing opportunities to delve into research. My personal philosophy regarding the goals and methods of effective pedagogy has been informed by my experiences as a reflective student; as a speaker presenting in seminars, reading groups, and conferences; as a teaching assistant; as a provider of guidance/feedback to graduate students on research projects; and, importantly, as a developer and instructor of a graduate course on complex-analytic combinatorics in the UIUC mathematics department.

1.1 Pedagogical style
Regarding lecturing style, in explaining a theorem, proof, algorithm, or any other piece of technical subject matter, I feel that it is essential to emphasize a conceptual understanding: theorems should be well-motivated and placed in appropriate context, and their formal statements should be supplemented with intuitive explanations. When presenting a proof or an algorithm, I would give details as necessary, but my goal would be to impart an understanding of the “big picture”, from which the details (which may fade from memory) naturally follow.

Regarding my choice of material, I feel that it is useful to include (if possible) some discussion of current research related to the subject matter, so that students are left with an appreciation for the evolving nature of the subject. Additionally, I hope that this approach eases students’ transitions into research roles by leaving them better informed about the state of the art.

My approach to lecturing is only one part of my overall pedagogical approach: problem sets and student presentations would complement lectures, allowing for students to evaluate their understanding and to develop their capacity for technical rigor and clear communication.

1.1.1 Problem sets, periodic assessments
In my experiences as a student, I felt that I understood lecture material best after I had applied it to solve exercises. This enabled me to evaluate my understanding of the material, to build facility with fundamental concepts, and to suggest avenues for further exploration. Thus, in my own teaching, I tried to provide problem sets with exercises of varying levels of difficulty: simple ones to solidify basic notions, as well as more open-ended ones to build experience in formulating rigorous mathematical arguments and to lead students to discover important concepts on their own.

For undergraduate courses, in addition to problem sets, I would include regular quizzes for the purpose of assessing how well students are absorbing the material and how well I am meeting course objectives. I would then modify my teaching plan accordingly.
1.1.2 Student projects and presentations

Additionally, in various courses, I have found that student presentations provide valuable supplementary material to lectures, and my experience of working on an open-ended project honed several skills that are essential for successful research. Based on these experiences, I would incorporate (when appropriate to the course) student projects and presentations, either of their own original research efforts or of surveys of relevant topics of interest to them. In addition to the advantages to the students, I believe that it is likely to expand my own horizons, exposing me to topics that I have not previously had time to explore.

2 Research advising style

Regarding my style of research advising, I have observed a few different styles, with varying levels of involvement of the advisor and advisee. I feel that the most effective style is a hands-on, collaborative approach, wherein the faculty member and the advisee actively agree to pursue a topic of mutual interest. Having agreed upon a topic, I would then provide high-level guidance, suggesting possible approaches, relevant literature, etc. I believe that it is important to the success of the student to gain experience in all levels of the research process, from thinking about high-level research goals to formulating and solving concrete problems, and my approach would attempt to provide that experience.

Additionally, since my work is relevant to mathematical/statistical models of real-world networks and technologies, and would, therefore, benefit from empirical exploration and validation, I would consider involving undergraduates in computational projects. Depending on their interest and experience, I would also happily collaborate with advanced undergraduates on theoretical projects, as well.

3 Courses

Regarding specific courses, I would be happy to teach network science, data mining, algorithm design and analysis, applied probabilistic modeling, and machine learning courses, as well as a broad range of undergraduate computing courses. Given my own research interests, I would also enjoy teaching more focused special topics courses in random graphs and complex networks, including material on frontiers of the field and connections to machine learning (e.g., neural network methods for graph analysis) and to application domains (e.g., social networks), as well as in applied information theory (data compression, statistical lower bounds, etc.) and statistical/mathematical aspects of machine learning and data science. These would be especially useful to me in building a thriving research group. Finally, given my education and experience in industry as a software engineer, I can also incorporate hands-on components to my courses.

Additionally, I believe that there is value in faculty-advised, student-driven reading groups that explore current research. I would enjoy organizing such a group geared toward applied probabilistic/statistical and machine learning topics.