Teaching Statement Xuan Wang

Teaching is a highly enjoyable and rewarding process for me. I have gained valuable experience by teaching and mentoring graduate and undergraduate students from diverse backgrounds. With a **highly interdisciplinary background in biology, chemistry, statistics, and computer science**, I have served as a **graduate teaching assistant** for four courses, two in the **Computer Science Department** and two in the **Biology Department** at UIUC. I have also **mentored three graduate** and **four undergraduate** students for research during my Ph.D. study. All the students I mentored got co-authored papers with me in top-tier conferences.

1. Teaching Philosophy

As a teacher and mentor, my ultimate goal is to pass on knowledge and wisdom. I enjoy teaching and mentoring students, encouraging them to think critically, guiding them through the learning process, equipping them with skills and knowledge to approach real-world problems, and inspiring them to mentor and engage others in their lives. My teaching and mentoring experiences have helped me develop a teaching philosophy focusing on the following aspects: (1) **teaching is dynamic**: teachers should tailor what and how they communicate with students based on their diverse backgrounds; (2) **bridge theory and practice**: project-based assignments and real-world examples help students bridge the gap between theory and practice; and (3) **pass on the experience**: mentors should actively engage and motivate the students to grow into independent researchers with their own future goals. I then describe my teaching and mentoring experiences in detail.

2. Teaching Experience

During my graduate studies in biochemistry and computer science at UIUC, I served as a **graduate teaching assistant (TA)** for four courses with graduate and undergraduate students from diverse backgrounds. I have assisted in two courses, "Text Information Systems" and "Introduction to Data Mining", in the **Computer Science Department**. I have also taught a laboratory course, "Introductory Microbiology Laboratory", and assisted in "Introductory Biochemistry in the **Biology Department**.

The course "Introduction to Data Mining" is one of the most popular courses offered in the CS Department at UIUC, attracting more than 200 students enrolled, both undergraduate and graduate. In addition to the traditional classroom setting, this course is also offered in an online program. The course covers a broad spectrum of topics in data mining, including data preprocessing, data warehousing, pattern mining, classification, and clustering. Both the classic techniques and some recent advanced techniques are introduced. My role involved designing and grading projects and assignments, grading exams, and holding office hours to help the students complete the programming projects. I have great enthusiasm for interacting with students to help them understand the course materials and learn basic programming skills. The students came from a wide range of backgrounds, and many of them had no programming experience before. They usually struggled during the first few projects, but most of them would have a good understanding of data mining and a solid foundation for programming by the end of the semester. The course projects I designed included frequent sequential pattern mining and an introduction to machine learning algorithms. The students were excited about the projects, and many were motivated to join our research on data mining. Some even come up with brilliant research ideas that lead to publications in top-tier conferences in data mining and natural language processing.

In addition to my TA experience, I also have rich experience in delivering talks to the audience with diverse backgrounds. For example, I gave a 2-hour **tutorial** at the IEEE-BigData conference in 2019 on "Automatic Information Extraction from Text". The attendees included data mining experts, practitioners from industry, and research scientists in other areas. They gave me positive feedback about the clear presentation and rich technique contents for our tutorial. I was also invited as a **session chair** at the IEEE-BigData conference in 2019 for the "Algorithms and Systems for Big Data Search" session. I coordinated the presentations and promoted

discussions between the presenters and the audiences. I was also invited for **seminar talks** and **guest lectures** at various universities, including the CS department at UIUC, the CS department at UCSD, and the Information School at UT Austin. As part of these talks and lectures, I included plenty of real-world examples to better illustrate the problems and the solutions. I found these examples important in keeping the audience engaged, motivating them to think actively and ask insightful questions. These active interactions also give me many inspirations to improve my research.

3. Mentoring Experience

I have been leading the biotext mining group at UIUC, with extensive and in-depth collaborations with researchers from different universities (e.g., the Biology Department and Chemistry Department in UIUC, and the Medical Schools in UCLA and UC Davis). I have mentored **three graduate** and **four undergraduate** students during this process, organizing weekly meetings and teleconferences on bio/chemistry text mining research, working on bio/chemistry scientific literature mining, and pushing the research frontier forward. From my mentoring experience, I found it necessary to adjust how I mentor based on the students' backgrounds and their experience with research. For students who are just starting with research, I found it important to give them direct and concrete tasks to work on to "get their hands dirty" with research. As the students grew more comfortable and experienced, I encouraged them to think more independently and see how their work fit into the long-term research goals. Throughout the mentorship, I always encouraged the students to discuss any difficulties they had. All the students I mentored got co-authored papers with me in top-tier conferences. Some are inspired to continue academic research by joining CS Ph.D. programs at CMU, UC Berkeley, and UIUC. Some joined tech companies such as Google and Amazon. I gained valuable experience in developing skills needed to help train the next generation of researchers and engineers.

4. Teaching Interests

Equipped with my experience, I am well prepared for teaching in academia. I am capable of teaching any undergraduate- and graduate-level courses on **data mining**, **natural language processing**, **machine learning**, **statistics**, and related **data science**, as well as basic courses in **programming**, **data structures**, and **algorithms**. I also want to develop an **advanced course on text mining** based on my areas of expertise, which gives a broad overview of state-of-the-art text mining techniques drawn from computer science, engineering, applied mathematics, and statistics, as well as the role of text mining in real-world applications. Besides classroom activities, I plan to participate in outreach activities to encourage the participation of minority groups. My ultimate goal is to help students grow and improve their skills to achieve their own future goals. With great enthusiasm, I look forward to educating the next generation of researchers and engineers in data mining and, more generally, in data science.