Teaching Statement

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1 Teaching Philosophy

My teaching philosophy is deeply influenced by my interdisciplinary academic journey. I majored in biology during my undergraduate studies, obtained my master's degree in operational research from a mathematics school, and am now pursuing my Ph.D. in computer science. Having repeatedly transitioned into new fields from a beginner's perspective, I have learned that effective teaching is not simply about transmitting knowledge, but about lowering the barrier of entry into unfamiliar intellectual spaces and inspiring students' curiosity. My goals as an educator are: (1) to help students from different disciplines, no matter mathematics, biology, or other fields, succeed in the areas they wish to explore, and (2) to help students build confidence when approaching new topics, no matter what they will face in their future career paths.

We are now living in an era of rapid interdisciplinary convergence and unprecedented expansion of knowledge. New tools, new data, and new research questions constantly reshape the boundaries between fields, making lifelong learning an essential skill for every student. In such an environment, the ability to enter unfamiliar disciplines, adapt quickly, and build connections across areas becomes more important than mastering any single static knowledge. My own academic transitions have shown me that students are fully capable of learning beyond their original training when supported by thoughtful guidance and accessible teaching practices. These experiences shape my commitment to designing learning environments that empower students to explore new domains with confidence.

Particularly in computational biology and bioinformatics, students often come from diverse academic backgrounds. My aim is to mentor them in bridging disciplinary gaps and becoming researchers who combine rigorous mathematical modeling, strong implementation skills, and the ability to solve real-world problems. In my teaching, I present complex ideas through engaging applications, beginning with intuitive examples and gradually guiding students to find beautiful theoretical and mathematical structures.

2 Teaching Approach

A central aspect of my teaching approach is designing materials that accommodate students with diverse levels of prerequisite knowledge and different needs. During my graduate studies, I was invited to the School of Mathematics and Statistics at Shandong University (Weihai) to teach a short course on deep learning. The audience included both biology and mathematics students, which required careful syllabus design. Instead of focusing heavily on theoretical derivations, I created an application-driven curriculum where students learned to build deep learning models in PyTorch "like assembling Lego." This structure enabled students to quickly gain hands-on experience while developing intuition about the underlying concepts. Mathematics students already learn some theoretical principles of deep learning, while biology students were primarily interested in how to use deep learning to solve practical problem, designing a course that served both groups strengthened my ability to adapt teaching strategies to diverse audiences.

More broadly, I emphasize intuition through metaphors and concrete examples before introducing modules of PyTorch step by step. I also incorporate project-based learning, encouraging students to employ what they learn from class to build their own models and explore problems independently.

3 Open Source Ethos of Teaching

Having transitioned across multiple disciplines, I benefited greatly from open educational resources such as online courses and academic blogs. Inspired by these experiences, I actively support learners through my personal academic blog, where I publish learning notes and tutorials aimed at helping newcomers enter computational fields. One particularly meaningful experience involved mentoring a reader of my blog from a biology background with no prior computational training; through sustained discussions and guidance, she successfully enrolled in a bioinformatics Ph.D. program in Australia. Experiences like this strengthen my belief that education opens limitless possibilities and that students can successfully learn beyond the boundaries of their original disciplines.

My interdisciplinary background also shapes my commitment to inclusive teaching. Because I have experienced moments of confusion when entering new fields, I strive to provide multiple entry points into complex topics, ensuring that students from biology, mathematics, or computer science backgrounds can all engage meaningfully with the material.

4 Teaching and Mentoring Experience

My teaching experiences began during my undergraduate studies, where I served as a senior peer mentor supporting approximately forty freshmen in courses such as probability and statistics and inorganic chemistry. Working with students facing different learning challenges taught me the importance of patience, clear communication, and iterative explanation.

Together with my later invited teaching and mentoring activities, these experiences have shaped my view of education as an interactive and student-centered process rather than a one-directional transfer of information. Understanding students' backgrounds and learning goals is essential for effective teaching.

5 Courses I Can Teach

Based on my interdisciplinary background spanning biology, mathematics, and computer science, I am prepared to contribute to teaching at both undergraduate and graduate levels.

At the undergraduate level, I am comfortable teaching foundational courses such as:

- Data Structures and Algorithms (e.g., CS XXX)
- Discrete Mathematics (e.g., MATH/CS XXX)
- Introduction to Computational Biology (e.g., BCB XXX)
- Linear Programming (e.g., MATH/CS XXX)
- Graph theory (e.g., MATH/CS XXX)

At the graduate level, I am particularly interested in teaching advanced and specialized topics aligned with my research:

- Algorithms for Bioinformatics
- Sequence algorithms
- Probabilistic Models in Biological Data
- Data Structures in Bioinformatics

In addition, I am enthusiastic about developing new interdisciplinary courses that bridge computation and biology, such as: **Scalable Algorithms for Sequence Analysis**.

These courses would emphasize both theoretical foundations and biological applications in this data-intensive era.

6 Future Teaching Vision

Looking forward, I aim to integrate my research in large-scale sequence analysis and computational biology into both undergraduate and graduate teaching. I am particularly interested in developing courses that emphasize algorithmic thinking for biological data, probabilistic modeling, and scalable computation. By incorporating real-world datasets and project-based assignments, I hope to guide students through the full pipeline from problem formulation to implementation and application.

Ultimately, my goal as an educator is to train students not only to use tools or theorems, but to think critically across disciplinary boundaries and approach scientific problems with both rigor and creativity.

7 Future Teaching Vision

Beyond individual courses, I am committed to contributing to the broader educational mission of the department. In particular, I will contribute to

First, student backgrounds will become increasingly diverse. In computational fields, classrooms will include students trained in biology, mathematics, computer science, and other disciplines. I aim to design inclusive curricula that provide multiple entry points into complex topics, allowing students with different background to succeed and collaborate effectively.

Second, students' career paths will also becoming more diverse. Students pursue a wide spectrum of paths, ranging from theoretical research and algorithm design to tool development and applications in domains such as genomics and disease, as well as industry roles in data science, biotechnology, and software engineering. I aim to help students identify and pursue their own career paths within an increasingly interdisciplinary environment, while also developing the ability to collaborate effectively with individuals from diverse backgrounds in interdisciplinary research.

Ultimately, my goal is to help shape an educational environment where students are not only trained in specific techniques, but also equipped to learn continuously, adapt to new fields, and contribute creatively to interdisciplinary scientific challenges.