

Teaching statement

My teaching goal in classrooms is to help students develop higher-order thinking skills including critical analysis, problem solving, synthesis of complex ideas, and quantitative reasoning, particularly within the emerging fields of systems and synthetic biology. These skills are essential for academic success and for preparing students to make meaningful contributions to society. I aim to create a learning environment that encourages students to challenge assumptions, explore diverse perspectives, and critically evaluate scientific research literature.

My teaching philosophy is inspired by the student-centered learning approach, active learning, and DEI-informed dialogic pedagogy. I believe that students learn best when they are actively engaged in the learning process, and applying concepts to solve real-world problems. For example, students could work in teams to design synthetic biology solutions to real-world problems such as food security, sustainable energy, or affordable and accessible medicine.

Active learning starts with the curricular planning process, where courses are designed to promote student engagement. A very effective method that puts students at the center of the learning process is the backward design process. This method starts with identifying the learning outcomes, then designing assessments to measure student progress, and finally planning the instruction and learning activities that can help the students achieve the learning outcomes. I aim to apply this method in course design to align learning outcomes with assessments and learning activities.

For instance, I will first identify key skills that students should acquire by the end of the course, such as the ability to model, analyze and design genetic circuits. Next, student learning will be assessed through a project-based presentation or computational modeling problem sets. Finally, class activities will take the form of a flipped classroom learning model where pre-class materials e.g. readings prepare students for in-class activities e.g. problem-solving, and discussions that guide students toward mastering these skills.

Guided by the principles of DEI-informed dialogic pedagogy, I aim to create an inclusive and welcoming classroom climate where every voice matters and is valued, diverse perspectives are welcomed and respected, open-ended discussions on controversial topics such as the ethical and societal implications of human genome editing are facilitated, and equity-based course content is provided such as case studies on the accessibility to medicine in under-represented communities and overcoming the barriers to access biotechnological advances in resource-limited societies.