TEACHING STATEMENT

Mathematics is unusual among disciplines in how starkly the gap can appear between knowing a definition and understanding it. A student can state the definition of holomorphic functions perfectly and still have no understanding of why it matters. My teaching centers on closing that gap: helping students develop genuine intuition, persevere through difficulty, and communicate their reasoning with clarity and rigor. These three principles — intuition, autonomy, and communication — shape how I structure individual lectures, design courses, and mentor students.

1. Curriculum

My primary areas of teaching expertise beyond calculus and linear algebra are real and complex analysis, geometry, topology, and dynamical systems. When designing a course, I start from what students can see and apply, rather than just the theorems they can state. In Ordinary Differential Equations, for instance, I begin with a collection of concrete systems (e.g. logistic family, harmonic oscillators, predator-prey, etc) and spend the semester carefully building the tools needed to understand their behavior. I look forward to teaching graduate courses and developing topics courses in quasiconformal geometry and complex dynamics using this same approach: starting from concrete objects (Riemann surfaces, Julia sets) and building outward to the machinery that explains them.

I also look forward to directing undergraduate projects and mentoring graduate students in my field of research, complex dynamics, and its connections to other areas. Complex dynamics offers natural connections to complex analysis, hyperbolic geometry, and number theory, making it possible to develop projects that range from concrete explorations of fractal geometry to problems at the intersection of several areas. For undergraduate students, an exploration of popular fractal objects such as the Mandelbrot set demands that students rigorously justify some of their visually appealing features via complex analysis and geometry. For graduate students, complex dynamics remains a very active and rich field of research filled with numerous conjectures and open problems that are easy to state but often require sophisticated machinery to solve.

2. Teaching philosophy and practice

Students learn mathematics most deeply when they develop strong intuition behind mathematical objects and arguments. In lower-level courses, I help students relate to new concepts through geometric illustrations. For example, in Multivariable Calculus, I draw connections to mechanics and use mathematical animations via GeoGebra 3D to illustrate objects such as tangent planes and vector fields. In upper-level courses, I encourage students to begin thinking like mathematicians by asking them to identify the key ideas behind technical proofs through open-ended questions. What makes this proof work? What is the picture or intuition behind it? How can the same strategy be generalized to different settings? I also provide examples to illustrate the scope of a theorem and counterexamples to expose its limitations, so students see precisely which hypotheses are doing the work.

Students build lasting mathematical autonomy not from arriving at correct answers but from learning how to get themselves unstuck. When students ask me for help in their work, I resist supplying the missing step and instead ask a targeted question that hands the problem back to the student. Where exactly does the argument break? What would a counterexample need to look like? I also try to normalize the experience of being stuck:

I share moments from my own experience where an approach failed for a while before the right idea appeared. I design problems that reward a well-reasoned false start as much as a clean final answer. Students who once treated being stuck as failure learn to treat it as the first step of problem solving. This is a shift that will carry them through a thesis or their first open research problem. My experience guiding students through Directed Reading Programs has reinforced this philosophy: when there is no prescribed path to a solution, my role is to help students develop the resilience and independence to navigate unfamiliar mathematics themselves.

I also find that students learn best when they are able to practice writing and speaking mathematics. In lectures, I emphasize the importance of clear definitions and notations. I provide detailed feedback on written assignments to ensure students learn to write mathematics more clearly. During office hours, I encourage students to discuss problems among themselves. In lieu of traditional examinations, I have also begun providing project-based assessments to foster mathematical communication. For example, in the geometry course that I taught in spring 2026, I opted for a combined written report and oral presentation as the final assessment. By the end of the project, the students had become more comfortable communicating mathematics in both written and oral forms. Overall, this assignment effectively helped them demonstrate a deeper understanding of the material and explore their interests beyond the syllabus.

3. Support, inclusion, and reflection

The three principles above also shape how I support students outside the classroom. Learning mathematics not only requires that students spend time with the material, but also that they have ample resources to seek help. In every course that I teach, I provide clear and accessible notes, textbook references, and, whenever feasible, a generous amount of practice problems. I aim to calibrate assignments carefully so that students are challenged without being overwhelmed. Moreover, I aim to provide detailed, constructive feedback to students' work in a timely manner.

Throughout every contact with students, I strive to maintain a safe, respectful, and inclusive learning environment. These practices are particularly important in mathematics, where students enter advanced courses with varying backgrounds and levels of confidence. I saw this directly teaching for Stony Brook's Simons STEM Scholars Summer Bridge program, where a group of talented students arriving from different educational and socioeconomic circumstances taught me the importance of closing confidence gaps. In lectures, I find that explicitly identifying tricky parts of the course material and sharing my own stumbles helps normalize confusion and ease students' anxieties. I regularly remind my students of campus resources and office hours. I also proactively reach out to students who suddenly disappear or underperform and follow up with regular, brief check-ins to make sure that they are not falling behind.

I continually reflect on my teaching and mentoring performance and strive to be a more effective educator. Early in my teaching career, I received feedback that some students felt too intimidated to ask questions. Since then, I have made a conscious effort to smile and make appropriate jokes to maintain warm and lighthearted environment. I have also begun taking regular pauses to allow students to process information. As a result, in the previous academic year, my average teaching effectiveness score increased to 4.77/5.00, well above the department-wide average of 4.40.