Tyler Chen
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Teaching Statement

https://chen.pw

I greatly enjoy working with students, and I am committed to pursuing excellence in my teaching. To date I have served as the instructor of record for four undergraduate math courses (including my current course). I am especially passionate about teaching numerical analysis, and developed an entire curriculum (comprehensive 150+ page typeset course notes, in-class worksheets, homework problems, coding examples, etc.) for the class.

Outside the classroom, I have worked closely with a number of undergraduate students on research projects, particularly those from groups underrepresented in math and science. My efforts including conceptualizing projects suitable for students without a PhD level background in computational math, as well managing as weekly meetings with student, and searching for opportunities for students to present about their research.

Teaching style. My teaching philosophy is centered on self discovery, because students learn and retain knowledge best when they arrive at conclusions themselves. In addition, I believe that students must develop the skills required to communicate their understanding of technical topics like math to others. These two goals are facilitated through in-class group activities as well as homework problems which require responses written in sentences (i.e. explaining the intuition behind a phenomenon). In total, I believe my teaching approach will “equip [students] with the broad knowledge base and tools to become creative thinkers and active learners throughout their lives”.

Post-pandemic, my courses have involved a mix of traditional lecture and worksheets which are done in small groups of 2-3 students while I circulate the classroom to provide guidance and direction. These worksheets are carefully designed to facilitate “self-directed discovery” of key concepts from the course while forcing students to discuss new mathematics with one another. They are integrated into the lectures in that the content preceding the worksheets sets the context for the worksheet, and the content directly following the worksheet helps tie the worksheet back to the “big-picture” of the lecture.

As an example of the flavor of the worksheets, consider the following excerpts from the worksheet activity I do on the first day of my numerical analysis course. Half of the groups receive the left worksheet and half receive the right worksheet:

- Solve the system of equations: $x+2.10y = 4.32$ and $2.78x-3.20y = 0$.
- Solve the system of equations: $2.3x - .99y = 1$ and $2.31x - 1.00y = 2$.

- Solve the system of equations: $x+2.12y = 4.30$ and $2.80x-3.21y = 0$.
- Solve the system of equations: $2.3x - .98y = 1$ and $2.31x - 1.01y = 2$.

The students in each group then work together to solve the problems on their worksheet. In this particular case, the problems are basic but provide a chance for students who haven’t seen linear systems in a while to get brushed up. Then after enough time has passed that most of the groups have obtained the solution to their systems, groups with different versions pair off to compare their worksheets. They are prompted to discuss the following:

[redacted]

> - Compare your systems and solutions. Were the systems close? Were the solutions close?
> - What happened? Why?

Of course, what it even means to be “close” is intentionally undefined, which inevitably results in some discussion or debate among the students. The groups should eventually (perhaps with some prompting) arrive at the conclusion that while both the systems are close, the solution to the first systems are close while the solutions to the second systems are far! As a class, we then explore what different groups answered, and the logic behind their responses. We then return to lecture, where I aim to provide a general introduction to conditioning and stability, using the worksheet as a starting point for motivating the importance of numerical analysis as an area of study.

I have also experimented with class-projects aimed at boosting student’s investment in their own learning as well as their presentation skills. This has been popular among students. The final project culminates in a written report and a poster presentation. The poster presentation is structured a bit like a conference poster session: half the students set up their posters to present while the other half visit the posters and interact with the presenters (with a worksheet designed to help guide the interaction). The students then swap roles. Compared to an individual presentation in front of the whole class, this is both less-stressful for students, more interactive, and more time-efficient.

[redacted] school specific info [redacted]

[redacted]

Mentorship.

As I advance in my career to tenure track faculty, I plan to involve graduate students, primarily PhD students, into my research program [redacted]

[redacted]

I have mentored many undergraduate and high-school students, the majority of which belong to groups historically underrepresented in math and science. Involvement and training of students is a major aspect of my research program, and I have recently applied for a NSF Computational Mathematics grant to help support the students I work with [redacted] Since most of my mentees first interacted with me in my classes, I feel this is in part a testament to the type of inclusive classroom environment I foster.

I believe strongly in exposing undergraduates to all aspects of the research process, and helping develop them into independent researchers.

For the last year, I've worked closely with [redacted] details about student projects [redacted]

This semester I begin working with [redacted]

In addition to research projects, I'm also currently supervising independent studies with two students, and I will supervise another independent study in the spring.

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Courses Taught/TAd

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Instructor, Numerical Analysis (NYU MATH-UA 252) . . . *Fall 2023*
Instructor, Numerical Analysis (NYU MATH-UA 252) . . . *Spring 2023*
Instructor, Mathematical Statistics (NYU MATH-UA 234) . . . *Fall 2022*
Instructor, Applied Linear Algebra and Numerical Analysis (UW AMATH 352) . . . *Spring 2021*
Instructor, Interdisciplinary Writing/Natural Science (UW ENGL 199) . . . *Winter 2021*
Instructor, Interdisciplinary Writing/Natural Science (UW ENGL 199) . . . *Autumn 2020*

TA, Probability and Statistics for Computational Finance (UW CFRM 410) . . . *Winter 2019*
TA, Calculus with Analytic Geometry I (UW MATH 124) . . . *Autumn 2018*
TA, Calculus with Analytic Geometry II (UW MATH 12) . . . *Winter 2018*
TA, Calculus with Analytic Geometry II (UW MATH 125) . . . *Autumn 2017*
TA, Electronics (Tufts PHY 41) . . . *Spring 2017*
TA, Electronics (Tufts PHY 41) . . . *Spring 2016*

Grader, Discrete Mathematics (Tufts MATH 61) . . . *Spring 2016*
Grader, Calculus III (Tufts MATH 42) . . . *Fall 2015*
Grader, Differential Equations (Tufts MATH 51) . . . *Spring 2015*
Grader, Calculus III (Tufts MATH 42) . . . *Fall 2014*