Teaching Statement

Mark Tygert

Disclaimer: The sole purpose of this teaching statement is to apply for jobs; I make no serious attempt to give appropriate credit to those who mentored me and taught me to teach.

Please note that I would not be considering a return to academia if I were not interested in teaching. Teaching appears to come naturally to me, and honestly I love teaching, especially when I can make it highly interactive.

1 What do I know?

This section describes my educational background and knowledge.

Courses which I could easily teach include basically any kind of mathematical analysis, computational science (excepting biology or chemistry), data science, machine learning, artificial intelligence (aside from classical linguistics), probability, and statistics. Mathematical analysis includes real, complex, functional, harmonic, and numerical analysis. In mathematics, I could also teach up to the introductory graduate level in topology, geometry, algebra, formal logic, and set theory, but those are not my strengths. And suffice to say that number theory does not come naturally to me. I also cannot teach how to teach. My own education is fairly broad across mathematics, physics, and statistics, and is broadening in computer science and electrical engineering.

For general-interest courses, my greatest interest would be in teaching about the limitations of various sciences and mathematics, as elaborated in an overview, "An optimizable scalar objective cannot be objective and should not be the sole objective," available at `https://arxiv.org/abs/2006.02577` (this covers the relevant epistemology from a technical point of view).

At Meta, I spend most of the time consulting on data science, statistics, numerical computation, and their interfaces with artificial intelligence. This consulting often involves nothing more than teaching to those inquiring the parts of the aforementioned subjects that are relevant to solving the practical problems posed.

2 Interdisciplinary combinations

This section discusses the possibility of teaching interdisciplinary courses.

Those who know that my background spans many disciplines sometimes ask about teaching interdisciplinary courses, such as computational physics, mathematical physics, computational statistics, mathematical statistics, or various versions of the inherently interdisciplinary data science. Those are definite possibilities.

My impression has been that such courses tend to focus more on one of the two disciplines. Thus, computational physics often emphasizes computation, mathematical physics often emphasizes mathematics, computational statistics often emphasizes computation, mathematical statistics often emphasizes mathematics, and data science often emphasizes either data or science, seldom both simultaneously. In fact, I taught mathematical physics at Yale from the book, *Mathematics of*

Classical and Quantum Physics by Byron and Fuller. And I taught mathematical statistics at NYU from the books, *Kendall's Advanced Theory of Statistics* (all volumes) by Kendall et al., *Theory of Point Estimation* and *Testing Statistical Hypotheses* by Lehmann et al., *Mathematical Statistics: Basic Ideas and Selected Topics* by Bickel and Doksum, and *Mathematical Statistics and Data Analysis* by Rice. (Naturally, the courses covered only a subset, though of course as the instructor I have gone through all those books cover-to-cover.) In my opinion, no one could possibly mistake those for being textbooks on applied physics or applied statistics; the emphasis is on the mathematics.

If I were to teach such courses, I could place more equal emphasis on the two disciplines involved. But I fully understand that the expectation based on what is de rigueur throughout the world is that such interdisciplinary courses will emphasize one discipline more than the other.

3 Summary evaluations

This section discusses the enclosed evaluations that students made at the end of courses at NYU and UCLA.

Attached are all summary evaluations I have from NYU and UCLA. Strangely enough, NYU's Courant Institute did not produce summary evaluations until my last two years there (and then only for undergraduate courses), which is the reason for including in addition those from even longer ago from UCLA. I also have the students' handwritten responses to NYU's evaluation forms, but figured that no one other than myself would bother reading all the individual assessments by the students ... if you would like to see the pile of these, just let me know.

4 Teaching philosophy

This section comments about my one possibly idiosyncratic view on pedagogy.

While lecturing, I periodically ask questions of the audience, in order to gauge my progress in teaching by gauging the audience's progress in understanding. Naturally, I also try to answer all questions that students raise on their own. Professor Yakov Sinai of Princeton always asked many questions of us students in his courses and I have fully adopted that technique.

Spring 2012

Student Evaluation-End term Summary

Mark Tygert Course: **V234-1 MATH STATISTICS** LEC

With the exception of Overall Evaluation, the possible rankings were:
1. Poor; 2. Fair; 3.Good; 4. Very Good; 5. Excellent

A total of 16 students replied to this questionaire.

Q1:	Ability to present material clearly	4.31
Q2:	Ability to respond to questions	4.75
Q3:	Availability during office hours	4.75
Q4:	Level of preparations for each class	4.75
Q5:	How would you rate the course?	3.81
Q6:	How would you rate the text?	2.75

Overall Evaluation

1. Would you recommend this instructor to a friend? (Yes, No, or Maybe)

Yes: 81.25% No: 0.00% Maybe: 18.75%

2. How would you rate the overall teaching ability of this instructor? 4.38

Comments were also requested and any comments are listed below.

A+, cannot think of improvements.

Pretty good everything. I would have liked more topics in data analysis, bayesian inference and decision theory.

Did not like the textbook whatsoever. I used other materials to study.

Mark Tygert takes a very difficult subject and presents it into clear and understandable terms. Great professor.

Very good teacher. My only complaint may be that a 55% weighted final is too high. Basically whatever your grade in the final will determine your grade. I don't think it should be like that .

Not much of what was lectured on in class was helpful for the homework.

Spring 2011

Student Evaluation-End term Summary

Mark Tygert Course: **V234-1 MATH STATISTICS** LEC

With the exception of Overall Evaluation, the possible rankings were:
1. Poor; 2. Fair; 3.Good; 4. Very Good; 5. Excellent

A total of 8 students replied to this questionaire.

Q1:	Ability to present material clearly	4.50
Q2:	Ability to respond to questions	4.63
Q3:	Availability during office hours	4.88
Q4:	Level of preparations for each class	4.38
Q5:	How would you rate the course?	4.38
Q6:	How would you rate the text?	2.88

Overall Evaluation

1. Would you recommend this instructor to a friend? (Yes, No, or Maybe)

Yes: 87.50% No: 0.00% Maybe: 12.50%

2. How would you rate the overall teaching ability of this instructor? 4.50

Comments were also requested and any comments are listed below.

Prof. Tygert definitely tries to be clear but he doesn't always respond to questions well and he is not always very clear.

I like how prof. Tygert goes through all the details that the book sometimes glosses over. The book is also rather old, and a lot of the material is outdated.

Very clear in explanations and proofs. I would like more examples directly following new material instead of in recitation later. This is more helpful than learning the proof behind it in a time crunch.

Very good and available for questions.

Well prepared. Systematic through each step. A very good course to go deeper than a general application course.

SPRING QUARTER 2009

Math 270C, sec. 1 – Mathematical Aspects of Scientific Computing: Computational Linear Algebra

9-9-9
Very enjoyable class I learned a lot.

9-9-9
Wonderful and inspiring professor.

7-9-9
The material and assignments were useful and interesting. Often mark seemed to make stuff as he went along but overall I learned a lot.

7-9-9
Repeats himself a lot. Otherwise ok!

WINTER QUARTER 2009

Math 164, sec. 1 – Optimization

6-9-8
It will be better to have a better textbook.

6-7-6
Professor Tygert was very knowledgeable about the material and did a pretty good job of communicating it. The course had some interesting and valuable parts that I learned.

4-7-7
It would be helpful to prepare lectures ahead of time.

9-9-9
Please speak clearly. The first exam was simple, but the second one was a bit difficult. Very good grading. We only need to provide the final answers. The textbook is good but we only receive the exert from the original.

9-9-9
I enjoyed the class very much.

9-9-9
He's very helpful inside the class as well as in the office hour. I find this class very useful and interesting.

7-9-6
Course was well presented and straightforward but didn't seem it. Most ideas seemed very basic or introductory, not necessarily with spreading out over 10 weeks.

8-8-9
I thought this class was very interesting.

Summary Evaluation By Section

Term: Fall 2009 Course: Linear Programming Num: G22.2945.1

Instructor: Mark Tygert Final Eval Grad

Enrollment: 0 Responses: 5 % Responses: Rating: Good

Q1.	Given the nature of the material, rate ability to keep the presentation interesting	3.40 Satisfactory
Q2.	Clarity of explanations	4.20 Good
Q3.	Blackboard presentation	4.00 Good
Q4.	Overall quality of lectures	3.60 Good
Q5.	Degree of preparedness	4.60 Excellent
Q6.	Availability of instructor for consulation	4.60 Excellent
Q7.	Overall rating of instructor	3.80 Good
Q8.	Fairness and appropriateness of exams	5.00 Excellent
Q9.	Overall rating of course	3.60 Good
Q10.	Usefulness of textbook	4.50 Good
Q11.	Perceived difficulty of course (1=far too easy 2=too easy 3=reasonable level 4=too difficult 5=far too difficult)	2.80 Satisfactory
Q12.	Amount of coursework (1=far too easy 2=too easy 3=reasonable level 4=too difficult 5=far too difficult)	2.67 Satisfactory
Q13.	Pace of course (1=far too easy 2=too easy 3=reasonable level 4=too difficult 5=far too difficult)	2.40 Fair

Overall Instr Rating: Good (4.02) Overall Class Rating: Good (4.05) Overall Lab Rating: NA

General comments:

I really liked the topic and professor. I only wish it had been a little faster.

Overall, a very good course:
great material
interesting lectures
Would highly recommend the instructor.

Professor	Course #	Name of Course
Tygert	Fall 2009 -G22.2945-001	Adv Tps: Numerical Anal

Comments:

I really liked the topic and professor. I only wish it had been a little faster.

Overall, a very good course:
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Would highly recommend the instructor.