

Capstone Project - 2021-2022 Statistics Pedagogy Fellow

Louis Cammarata

- Statistics TFs are confronted to many challenges in the classroom
 - Statistics attracts students from many fields: math, business, sciences, social sciences, etc.
 - TFs need to adapt to these audiences with different backgrounds, interests, and goals
- The statistician will continue facing these challenges after grad school
 - Discuss with non-specialists
 - Teach students/trainees
 - Communicate to business stakeholders
- As a Pedagogy Fellow in Statistics, I focused on designing and teaching the 2021-2022 version of my department's year-long Pedagogy course, STAT 303 (The Art and Practice of Teaching and Communicating Statistics)
- I approached the training of incoming TFs using 4 complementary angles:
 - **Learning** who are your students/audiences, why are they here, what are they looking for
 - **Observing** new and experienced TFs via video consultations and shadowing
 - **Practicing** multiple microteaching sessions (with black board, slides, Zoom, etc.)
 - **Reflecting** on teaching philosophy and practices
- In this document, I report the syllabus that I co-designed with Prof. Morgane Austern, Prof. Joe Blitzstein and Prof. Xiao-Li Meng, as well as specific session scripts.
- These documents are available for TFs and PFs as a reference for pedagogy material (including publications and Bok Center materials)
- Many thanks to the Bok Center team and my mentor Dr. Yasemin Kalender for their support during the program!



Math



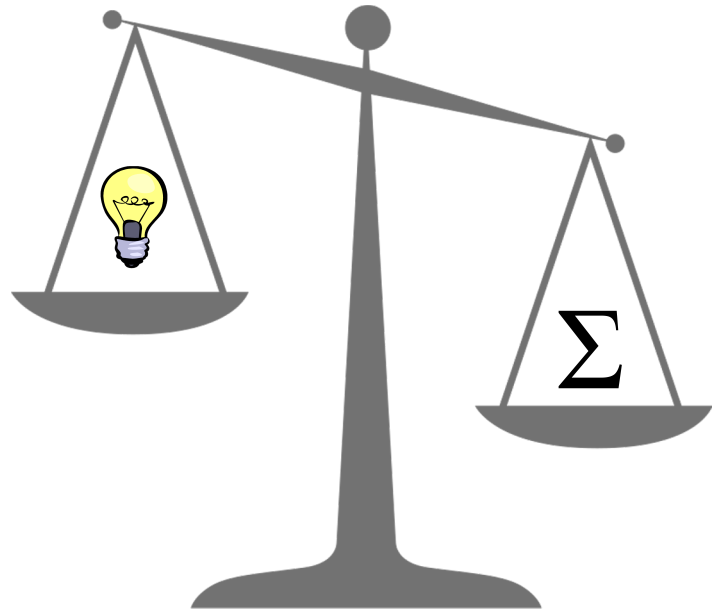
Business



Sciences



Social sciences



Learn

Observe

Practice

Reflect



Statistics 303hf
The Art & Practice of Teaching & Communicating Statistics
Department of Statistics and Derek Bok Center for Teaching and Learning
Harvard University
2021-2022

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Class Meetings

Meetings are from 3-5pm on those Tuesdays specified in the schedule. Class will begin at 3pm sharp.

This will be a year-long course, usually meeting in Science Center 706 or Science Center 304.

Course Related Web Pages

For general course information and updates, please refer to the course web page:
<https://canvas.harvard.edu/courses/89462>

For teaching-related questions and other useful resources, please refer to:
<https://bokcenter.harvard.edu/>

Goals and Prerequisites

The goal of this course is to help you become a good teacher and an effective communicator. There are several by-products of being a good teacher. If you master the art of teaching, and in particular, teaching Statistics, you will not only become successful in your teaching career but also an excellent presenter, acquiring effective communication skills and easing any stage fright you might have. Good communication skills, both orally and in writing, are essential in your professional and personal life, no matter what career goals you have set.

As some of you come from different educational and cultural backgrounds, we understand that you may consider teaching in an American classroom a challenge. We are here to supply the necessary tools and techniques to help you meet this challenge. Equipped with what you learn in this course, you will look forward to your first class as a Teaching Fellow.

Over the course, you will be given numerous opportunities to practice teaching as well as writing. Through suggestions and comments from the teaching staff and peer reviews, you will gradually learn what works well in the classroom (and what doesn't). If you consciously make an effort to follow these guidelines in the classroom, we are confident that you will be appreciated and recognized as an excellent TF by your students.

All first year Statistics Ph.D. students are required to take this course. Others who are interested in taking the course may talk to the instructors. There is a cap on the number of students allowed to take this course for credit. Therefore, the instructors reserve the right to decide individual enrollments on a case-by-case basis.

Texts and References

For presentation material, here are two free online textbooks to find source material:

- **[“OpenIntro Statistics”](#)** by David Diez, Mine Cetinkaya-Rundel, and Christopher Barr:
 - <https://www.openintro.org> also has other open resources (including two other texts) for teaching statistics
- **STAT 110** Textbook (***“Introduction to Probability”*** by Joseph K. Blitzstein and Jessica Hwang):

For interesting examples and activities: ***“Teaching Statistics: A Bag of Tricks,”*** by Andrew Gelman and Deborah Nolan, an excellent reference for a Statistics TF. This book will be on reserve in the library and is also available online (for free) via [Harvard Hollis](#).

Course Requirements

- Active participation in every class meeting is expected and encouraged.
- You will complete small writing assignments before and/or after some of the sessions; see the schedule for details.
- You will give three practice presentations during the Practice Teaching sessions in the fall and one in the spring; following this, you will teach a day of an actual section.
- You will be required to visit the session of an experienced TF early in the fall semester and report your observations.
- You will be required to hold one hour of office hours for an intro level class in the fall.
- You will meet individually with Louis occasionally to view and discuss your teaching videos.

Class Expectations

We expect everyone in this course to actively participate and engage in the classroom. We also expect everyone to work towards a supportive environment where we can all improve our teaching abilities and be open to hearing different viewpoints. To that end, we expect that you will treat everyone else, whether it is a classmate or a TF whose section you are attending, with respect. We also expect that criticism (since we all need to improve in some way) will be constructive, polite, and well intentioned.

Maintaining a course notebook

You will be expected to keep a dedicated notebook throughout the year, where you will reflect on course topics at the beginning and end of each class. This can be either an electronic notebook (recommended to make submitting assignments easier) or a paper notebook and should be brought to every class. The notebook is ultimately for *you* to keep a record of your thoughts, experiences, questions, and concerns about teaching and communicating statistics, but from time to time you may be asked to submit passages or logs for course credit.

Your Comments and Suggestions

We always welcome your comments or suggestions. Please feel free to tell us your opinions about any aspect of the course. Email is the most effective way to get in touch with us. You can also write us an anonymous note and drop it in our mailboxes, located on the 7th floor of the Science Center.

FALL 2021-2022 Schedule

Date & Location	Topics	Assignments (to be completed prior to class unless otherwise stated)
9/14/21 SC 706	<p>Introduction; Practice Teaching I The teaching staff will present an overview of the course. Participants will be asked to share past teaching experiences and general ideas about teaching, as well as to micro-teach a (non-statistical) topic of their choice for 5 minutes at the board (10-minute preparation). The class will also feature other activities designed to uncover challenges each student may face in teaching.</p>	<p><i>After the first class, write a brief paragraph describing your concerns about teaching and what you want from the course. This will be the first entry in your course notebook.</i></p>
10/5/21 SC 706	<p>Section Observation Discussion Each student will describe examples of good teaching and missed opportunities, and will report their observations from visiting sections. We will also spend some time to discuss preparing for the very first section.</p>	<p><i>Attend a STAT 110 section before 10/1/21 and note what you did and did not think was effective and anything else you find interesting or surprising during the section. Send a brief paragraph to Louis by the 10/3/21.</i></p>
10/12/21 SC 706	<p>Practice Teaching II (board) Each student will present for 15 minutes (including questions), followed by 5-minute class discussion.</p>	<p><i>Choose a topic from the options given and prepare a ~10-minute presentation. Use of the board is mandatory for this assignment. Presentation aimed at STAT 110 students.</i></p>
11/2/21 SC 706	<p>Part I: Knowing your students Some Statistics concentrators will join us to speak about their experience as students attending sections. Some of them also served as TF/CAs, so they can also speak about their experience teaching their own sections.</p> <p>Part II: Grading & academic integrity Open classroom discussion: instructors will also share their experience dealing with integrity issues.</p>	<p><i>Prepare at least 2 questions to ask the Statistics concentrators about their experience as students or course assistants.</i></p>
11/9/21 SC 706	<p>Part I: Inclusion, Diversity, and the Undergraduate Perspective This week we will discussing the topics</p>	<p><i>Read the Harvard Magazine article, "the twenty first century student." To what extent is the Harvard undergraduate life</i></p>

	<p>of diversity in the classroom with a workshop by Adam Beaver (Director of Pedagogy, Bok Center). We will focus on undergraduate life at Harvard, both in and out of the classroom, and how that impacts students' learning experience.</p> <p>Part II: The challenges of teaching section</p> <ul style="list-style-type: none"> - We will watch and comment videos of sections to discuss effective (and less effective) teaching strategies - We will go over the fictional physics section case study "The Quicksand of Problem 4", in which the TF gets progressively overwhelmed during section. 	<p><i>similar to, or different from, your own experience as an undergraduate?</i></p> <p><i>As you go through the content, please think of two questions you would like to ask Adam, about Harvard undergraduate students' daily lives and experiences in Statistics sections.</i></p> <p><i>Also take some time to read this webpage about inclusive teaching. As you go through the content, please think of one question you have about diversity or inclusion in the classroom.</i></p>
<p>11/16/21 SC 706</p>	<p>Practice Teaching III (slides)</p> <p>Each student will present for 15 minutes, followed by 5-minute class discussion.</p>	<p><i>Prepare a 15-minute presentation with slides. Send slides to Louis by the prior Thursday (11/11/21) and revise based on comments after. Presentations intended for statistical novice audience.</i></p>
<p>1/18/22 Virtual</p>	<p>Practice Teaching IV (Zoom); Mid-year Review and Reflection</p> <p>This is a virtual session. Each student will present for 15mn, followed by 5mn of class discussion. We will discuss best practices for virtual teaching and OH. Finally, we will review of the semester with discussion and tape-viewing. Discuss lessons learned and any new concerns or suggestions.</p>	<p><i>Prepare a 15mn Zoom presentation, intended for statistical novice audience (STAT110). You may use slides and/or tablets.</i></p> <p><i>Write a paragraph summarizing what you have taken away from this semester of the course and send it to Louis. Also, revisit your paragraph submitted prior to the first class; how have your concerns about teaching changed (or not changed) since then?</i></p>

SPRING 2021-2022 Schedule

Date & Location	Topics	Assignments (to be completed prior to class unless otherwise stated)
2/1/22 SC 304	<p>Introduction</p> <ul style="list-style-type: none"> • Presentation of Spring syllabus (30mn) <ul style="list-style-type: none"> - Focus on communication and writing skills - Heads up for two important writing assignments: Article Review and RSS Discussion • Module 1: Communicating Statistics to Stakeholders (60mn) <ul style="list-style-type: none"> - Students give their micro-presentations - Open class discussion based on the HDSR articles to read • Module 2: Teaching Statements (30mn) <ul style="list-style-type: none"> - Resources on how to write Teaching statements (Bok Center) - Discuss the students' Teaching Statements in class 	<ul style="list-style-type: none"> • <i>Module 1</i> <ul style="list-style-type: none"> - Prepare a 5mn micro-presentation with slides on the results of a data analysis for customer segmentation of a supermarket company (from this Kaggle page). Each student will act as a consultant presenting their result to business stakeholders (marketing team, C-suite) in order to identify the most promising customer segment to target. - Read the following HDSR article: <ul style="list-style-type: none"> *https://hdsr.mitpress.mit.edu/pub/pm67plq9/release/2?readingCollection=aba45cdf *https://hdsr.mitpress.mit.edu/pub/bfeyfx22/release/1 • <i>Module 2</i> <ul style="list-style-type: none"> - Write a short (half a page to a page) teaching statement. You can look at this Bok Center webpage to get ideas on how to write your statement. - Send your statement to Louis by 1/31/2022.
2/22/22 SC 304	<p>Learning & Assessment</p> <ul style="list-style-type: none"> • Module 1: Syllabus design (60mn) <ul style="list-style-type: none"> - Each student presents their syllabus for 10mn followed by 5mn of questions/comments - In class discussion on the general principles of syllabus design • Module 2: Measures of learning (60mn) <ul style="list-style-type: none"> - Students briefly present their readings about the modes of learning - In class discussion on the meaning of learning, and the ways that can be used by instructors to assess learning (in-class quiz, exam, HW, projects, etc.). 	<ul style="list-style-type: none"> • <i>Module 1</i> <ul style="list-style-type: none"> - Think about a Statistics/Probability course you would dream to take. Design a (2-page maximum) syllabus for the course (including, e.g., lectures, sections, assessments, and any other element that you think is relevant) and send it to Louis by 2/13/2022. - Prepare to defend your syllabus in front of the class for 10mn. • <i>Module 2</i> <ul style="list-style-type: none"> - Read two chapters of your choice (6 if you are not sure, we recommend chapters 2 and) from the book How Learning Works (freely available on Hollis); write a paragraph (<1 page) summarizing your

	<ul style="list-style-type: none"> - What is the importance of mathematical rigor vs. intuition/stories when learning Statistics/Probability? 	<p><i>impressions and send it to Louis by 2/13/2022.</i></p>
3/1/22 SC 304	<p>Practice Teaching V</p> <ul style="list-style-type: none"> • Module 1: Microteaching (80mn) <ul style="list-style-type: none"> - Each student will present for 15 minutes at the blackboard, followed by 5-minute of (challenging) questions and class discussion. • Module 2: Giving and Receiving Feedback (40mn) <ul style="list-style-type: none"> - A warm-up quiz: Which type of feedback sandwich are you? - In class discussion: What are ways to give feedback to students? - In class discussion: What are ways to collect feedback from students (Q guide, midterm feedback, etc.)? 	<ul style="list-style-type: none"> • <i>Module 1</i> <ul style="list-style-type: none"> - <i>Choose a topic in Statistics/Probability and prepare a 15-minute blackboard presentation (send your chosen topic to Louis by 2/27/2022). The target audience should be STAT210/STAT211 students. In this exercise, students will be pushed more on their deep understanding of the material they teach through challenging questions.</i>
3/29/22 SC 304	<p>Reviewing Research Articles</p> <ul style="list-style-type: none"> • Module 1: The academic peer-review process (30mn) <ul style="list-style-type: none"> - In class discussion on the peer-review process in Statistics/Probability conferences and journals • Module 2: Reviewing a research paper (90mn) <ul style="list-style-type: none"> - Students present their paper review assignment to the class - In class discussion on best practices to write fair, critical and time-efficient reviews. How can one write a critical review without being harsh/impolite? 	<ul style="list-style-type: none"> • <i>Module 2</i> <ul style="list-style-type: none"> - <i>Each student is assigned an anonymized short research article (no names), e.g., a conference article from NeurIPS, and prepares a 1st-round review of the article (1-2 pages). Send your review draft to Louis by 3/25/2022.</i> - <i>Since we have 4 students, we will give the same article to two pairs of students, so that students will be able to discuss each other's reviews in class</i>
4/12/22 SC 304	<p>Research Presentations: RSS Discussion</p> <ul style="list-style-type: none"> • Module 1: Presentation and Discussion (90mn) <ul style="list-style-type: none"> - Students will form groups of two. Each pair will read each other's work. - Each presentation will be: 15mins of a student discussing their research (with 	<ul style="list-style-type: none"> • <i>Module 1</i> <ul style="list-style-type: none"> - <i>Presenters: Write a research article (max. 1,500 words) about your current research project. This could either be an ongoing project, or otherwise a survey of key results in some area of interest. Also make slides for your in-class presentation.</i> - <i>Share your article with your partner and Louis at least one week before class</i>

	slides), 5mins of their partner presenting a “discussion” à la Royal Statistical Society (with slides), and 10mins of feedback.	<i>(4/5/2022). - Discussants: write a ~1-page discussion on your partner’s article and some slides for the in-class discussion</i>
4/26/22 SC 304	Year-Long Reflections & Grand Finale Our guest speaker will be Kelly McConville, Senior Lecturer in Statistics! Food will be served after the talk.	<ul style="list-style-type: none"> • <i>Year-Long Reflections</i> - <i>Write a paragraph (<1 page) summarizing what you have taken away from this course. How have your concerns about teaching evolved (or not evolved) since the beginning of the course?</i> - <i>Send your paragraph to Louis by 4/24/2022.</i>

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Session 1
9/14/21

PF: Louis Cammarata

Outline

- **Introductions (faculty, PF and students)** — 10mn
 - o Education, interest in teaching and research, fun fact
- **Teaching at Harvard (lectures, sections, OH, discuss the class syllabus)** — 20mn
 - o How is teaching done at Harvard, what do faculty/TF do
 - o Overview of curriculum for the year
- **Microteaching:** students teach any subject of their choice that is not probability or statistics (30mn = 10mn preparation, 3-5mn presentation per student)
 - o Examples: rules of cricket, making a campfire, describing a painting you like, etc.
- **Open discussion:** ask students to name and discuss challenges and opportunities about teaching (faculty may share their own experience) — 30mn
 - o Examples of challenges: answering hard questions, inclusivity in the classroom, getting students engaged, monitoring student progress
 - o Examples of opportunities: getting students excited about Statistics, learning better the material by teaching it and answering questions, developing communication skills
- **Conclusion:** introduce Bok Center resources and discuss next session's assignment — 10mn
 - o Many resources on supporting undergraduate students, creating an inclusive classroom, using feedback, managing time, improve communication skills:
<https://bokcenter.harvard.edu/bok-publications>
 - o [Hit the Ground Running](#) for new TFs
 - o Contact Pedagogy Fellow to discuss about teaching or request a consultation:
<https://bokcenter.harvard.edu/class-observations-grad>

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Session 2
10/5/21

Welcome students and discuss weekly assignment.

STAT110 Section Shadowing Reports (10mn)

- Invite students to share their experiences attending STAT110 sections (students can also draw from their experiences attending other sections at Harvard)
 - List positive comments about the teaching strategy adopted by the TF
 - List, if any, teaching strategies that you believe could be improved
 - What metrics/indicators do you use when making this analysis (your own understanding of the material, the way the TF was teaching, the way students behaved in section, etc.)

In the remainder of the session, we examine important characteristics/aspects of teaching at Harvard. We start by outlining best practices for the first day of class.

First day of class (10mn)

What are the objectives of the first day of class?

What are some important aspects that should be addressed in the first day of class?

- **Introduce yourself:** What are you studying at Harvard, what do you find genuinely interesting about this course, what are some of your other interests?
- **Get students hooked:** e.g. explain what questions this course will attempt to answer, connect the course to everyday life
- **Get to know one another:** ice breaker so that students can get to know each other, this can be useful when they form study groups for HWs. Also encourage students to use each other's names (using name tents).
- **Start with the course content as soon as possible:** engaging students in actual work during the first class communicates seriousness of purpose and gives students an idea of what the class will be like
- **Communicate expectations:** role of section, preparation required, participation required, etc.
- **Let students know how to contact you**

At Harvard, TFs are usually in charge of grading, which puts them in a position of authority. At the same time, new TFs may be barely older (sometimes even younger) than some students. It might be hard to find the right balance between friendly and formal.

Establishing and maintaining authority (10mn)

How do you establish authority and credibility in the classroom as a new TF?

- **Consider what having authority means:** at Harvard, students generally expect to be able to ask questions at any time
- **Manage anxiety:** you are an emerging scholar in your field, so even if you do not feel like an expert in the subject you are teaching, you are qualified in that you are able to learn it quickly and put it in the wider context of your discipline
- **Share your educational credentials** and relevant experience: this will help students learn more about you, and it will also help you connect with students and establish your credibility
- **Be prepared and organized:** knowing what you will do and how you will do it will help your confidence and ability to run a tight section
- **Plan how to deal with questions that you cannot answer:** defer them to offline discussions, or mention that you will email the student about them. It is better to take time to respond rather than giving an incorrect answer.
- **Know the course policies and procedures,** be explicit about expectations (e.g. meeting time) and hold students accountable
- **Address any inappropriate behavior:** if a student makes an inappropriate comment or engages in disrespectful behavior, it is necessary for you to address it. Focus on the behavior and not the person. Call it out and explain why it is an issue and state that you expect that it will not happen again. Act as quickly as possible and do not be afraid to seek support.

In addition to your general behavior and credentials, carefully preparing for section ensures that you will be more comfortable solving problems and leading discussions, which is key to building up your authority.

Preparing for and delivering a lesson (10mn)

How should you prepare for section?

What are some effective strategies to deliver a section?

- **Establish clear lesson objectives:** what do you want students to get out of the lesson? What should they know or be able to do as the result of the lesson? How does it connect with the larger course objective?
- **Create an agenda:** doing so will help you organize your time. You can share the agenda with the students. Each section should have a beginning, a middle, and an end. Have a clear introduction or agenda so everyone knows what is happening, then dive into the main part of the lesson. Wrap up with a summary and conclusion.
- **Be intentional about presenting information** (board, slides): print clearly and large enough, organize your board, do not erase notes until you ask if everyone is finished. Make sure that you face your students while speaking. **If working out a problem, it is valuable for students if you talk out loud about your thinking process.**
- **Infuse interactivity:** include opportunities for students to engage with the material in a meaningful way. You can ask students to answer questions, have them spend 5mn working in pairs on a problem, etc. See if there are ways to include active learning in your classroom (e.g. Think-pair share)
- **Allow students to engage in the material periodically** (e.g., every 20mn): look at your section in chunks, and before moving to another segment, provide an opportunity for students to make sure they understand the main points

Section is about teaching and delivering content (from the TF's perspective) just as it is about learning (from the students' perspective). Building a safe and healthy learning environment is key to fostering student learning.

Classroom dynamics (10mn)

What strategies can be implemented to create and safe and rich learning environment?

- **Set a positive climate by establishing ground rules** on how students should participate and communicate with one another (e.g. challenge ideas, not people, be familiar with the material covered in lecture to participate in an informed manner, make sure you allow others to contribute)
- **Facilitate discussions** so that talkative students do not intimidate quieter ones.
- **Treat your students' questions (and their mistakes) with respect** and interest and give immediate and comprehensive feedback whenever possible. Wrong answers can be used to clear up confusion.
- **Acknowledge students' contributions** in the classroom by expressing positive feedback such as "good" or "thank you"
- **Check in to see how things are going**, e.g. using feedback forms periodically asking "On a scale of 1-5, how comfortable are you participating in class?" or "What is one thing that would make things better?"
- **Manage different backgrounds**

Statistics TFs will in great majority teach problem set sections. This type of section requires particular skills. Note that some of you may also teach computer lab sections, which require other skills (for these sections, refer to the relevant Bok Center resources).

Problem set sections (10mn)

- **Clarify with the course head** what topics will be covered and the depth of understanding required of the students; e.g. some courses will require understanding and writing proofs (with different standards of rigor), and some other will not
- **Briefly review the week's pertinent material** to provide context for the problems; write out this review on the section handouts so that students can come back to it when studying for the midterm or final exam
- **When possible, try to allow students to tackle problems themselves.** This can be done by releasing section problems (without solutions) a few days before section, or by allowing students to tackle some problems in small groups during section (but this make take time)
- **Talk through the process:** emphasize the problem-solving process and codify thinking routines that are useful for students who are grappling with a particular type of problem. You may also explain why another approach would also work, or would fail.
- **Illustrate relevant problem-solving techniques:** prepare examples that are similar to what students will need to employ on their HW/exams.
- **Ask questions:** check understanding to find out whether students are having difficulty with the material. For example, if a problem makes certain assumptions, ask how students might change their approach if the assumptions were changed.

For further information, new TFs should refer to the relevant Bok Center resources.

Bok Center Resources:

- Bok Center Seminars, including
 - Foundations of Teaching in STEM
 - Classroom Culture: Fostering Equity and Inclusion in Community
 - And many more, see <https://bokcenter.harvard.edu/seminars>
- Bok publications: <https://bokcenter.harvard.edu/bok-publications>

Source: *Hit the Ground Running: A Handbook for New Teaching Fellows*
(https://bokcenter.harvard.edu/files/hit_the_ground_running_0.pdf)

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Session 4
11/2/21

Discussion with Statistics Concentrators (45mn)

Some Statistics concentrators (who also served as TFs/CAs) will join us to speak both about their experiences as students attending sections, and their experiences teaching their own sections. Sample questions can include:

- What are the main challenges for an undergraduate student in Statistics at Harvard?
- What are the most effective teaching strategies for Statistics?
- What do you expect from a Statistics TF (availability, communication, setting clear standards and expectations)?
- Is there a difference between learning/teaching Statistics and learning/teaching other scientific disciplines at Harvard? How should this inform the way we teach Statistics?
- How do students view grading and how to be a fair grader?
- What are the dynamics among students in the classroom? Do students/concentrators know each other well? Do they collaborate easily or is it challenging to find a HW partner?
- Are students comfortable asking for extensions on HWs if they need to? May that depend on their background?
- Can you speak more about the diversity of Statistics concentrators? How can the TF make sure to create an inclusive class environment?
- What are the things that you believe a TF might not see/understand well but could be highly relevant for students?

Grading & Academic Integrity (75mn)

- **Grading Exercise I (15mn):** give STAT303 students a CS20 HW that has been graded by 5 different TFs, and ask them to work in pairs to compare the grading style. Ask STAT303 students to share their thoughts, and address the following questions
 - Which versions do you prefer, and why?
 - What are some good/bad practices in grading?
 - How much and what type of feedback should the TF directly write on the paper?
- **Grading Exercise II (30mn):** give the STAT303 students a handout of the 2020 STAT111 midterm exam, solutions, as well as the papers of two students (names will be redacted). Ask STAT303 students to grade Problem 1 and 2 in pairs. Students should read carefully the exam statement and solutions, create a rubric, and grade according to that rubric. We will then spend time comparing the gradings and discuss the following important questions:
 - Challenges on how to make grading consistent: how similar are the scores on both papers across STAT303 students?
 - What is fair/unfair for partial credit?

- How important is it to have a rubric, and how detailed should the rubric be?
- **Discussion on grading best practices (15mn):** go over important aspects of grading with STAT303 students, allowing them to reflect upon the two exercises they just did.
 - What is the purpose of grading?
 - Assess students
 - Foster learning
 - Grading begins when you write the HW/exam
 - Have colleagues answer the questions before you distribute the assignment to students.
 - Write an answer key when you write the problems
 - Grading requires a proper rubric
 - Being conscious of your rubric: explicit criteria and what features count as evidence that each criterion is being met or not met
 - Being transparent with students: sharing with them ahead of time what it is
 - Aligning your rubric with your course: articulating the relationship between “this” assignment and the ones that scaffold up and build from it
 - Applying your rubric consistently: using a stable vocabulary when making your comments and keeping feedback focused on the criteria that make up the rubric
 - Grading requires consistency and fairness
 - Read a good number of student responses before you start grading.
 - Keep track of all modifications to the rubric.
 - Feedback should be fair and help students with their learning
- **Grading and academic integrity (15mn):** ask STAT303 students if they noticed any unusual similarities between the two exams from the previous exercise (these students were actually caught collaborating on the exam)
 - Discuss cheating, academic integrity and the role of the TF
 - Interesting statistical question: what is the p-value if the null hypothesis is that the students did not cheat?

References

- [Bok Center STEM Feedback workshop for PFs](#)

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2021-2022
Instructors: Joe Blitzstein, Morgane Austern
Pedagogy Fellow: Louis Cammarata

Session 5
11/9/21

Undergraduate Identities Workshop (60mn)

Adam Beaver (Director of Pedagogy, Bok Center) will lead a 1-h interactive workshop on undergraduate identities at Harvard, in the classroom and beyond.

Teaching and managing a section (30mn)

In this part of the session, we will focus on challenges that may come up when teaching section, using a case study from Solomon Friedberg's book (see references below).

- Ask STAT303 students to read The Quicksand of Problem Four (to make this interactive, we could ask different students to embody the narrator, Bill, Jim, Kathy, Fred, John and Sarah)
- Discuss with STAT303 students what went wrong in Bill's section
 - Should the TF expect students to have gone over HW problems before coming to section?
 - Should the TF solve HW questions on the board for students?
 - How can the TF manage time efficiently and balance unexpected questions with the material they expected to cover in section?
 - How should the TF respond to unexpected questions, if they indicate that the student is not grasping the material properly?
- Propose potential ways in which Bill could have salvaged the situation.

Teaching sections in other disciplines (30mn)

In past sessions, STAT303 students have had the opportunity to attend, analyze, and microteach, Statistics sections. Analyzing the way sections are taught in disciplines other than Statistics may yield insights regarding our own practice. In this part of the session, we will watch [video-recordings](#) of discussion-based sections in the humanities. In discussion-based sections, it is critical for the instructor to get students engaged, moderate discussions, and evenly distribute speech among the students. These points are, to some extent, also relevant for problem-based sections in Statistics.

- Watch the first video (the partition of India and Pakistan).
 - While watching the video, STAT303 students should take observation notes
 - Discuss in class the successes and challenges that the instructor experienced during section. What went well? What challenges were there? What are one or two things that the instructor can work on going forward?
- Watch the second video (the beginning of WWII) and discuss it in class as described above.

References

- [Bok Center Process for Peer Observations](#)
- [Teaching Mathematics in Colleges and Universities: Case Studies for Today's Classroom](#), by Solomon Friedberg

STAT303 Grand Finale

The Art and Practice of Teaching and Communicating Statistics

KELLY McCONVILLE

A Cautious Survey Statistician's Approach to Estimation in the Age of Big Data

Tuesday, April 26th, 3:00-4:15pm (EDT)
Science Center Room 316
Reception at 4:15pm (food will be served)

Abstract

For survey statistics practitioners, it sometimes feels like **the sky is falling**. **Response rates** are declining. **Data collection** costs are increasing. **Federal budgets** are shrinking. For survey statistics **researchers**, the sky isn't falling but is raining **exciting**, new data sources and modeling techniques. In this talk, I will present one **modern, but cautious, approach** to survey estimation where predictive models link survey data with additional data sources. Drawing on **my collaborations** with the U.S. Bureau of Labor Statistics and the U.S. Forest Inventory and Analysis Program, we will explore the performance of this approach and consider some **lessons learned**. I will close out with thoughts on **what makes a good statistics talk**.

About Kelly!

Kelly is a senior lecturer in the Department of Statistics at Harvard University. Before that, she was an associate professor of statistics at Reed College. Kelly is an accomplished survey statistician who develops estimation techniques that combine complex survey data with big data sources. **She also nurtures a passion for statistics education and has been a mentor for many budding stats researchers!**

