



## TEACHING STATISTICS: STAT 592 SPRING SEMESTER 2018

I'm a great believer that any tool that enhances communication has profound effects in terms of how people can learn from each other, and how they can achieve the kind of freedoms that they're interested in.

— Bill Gates

This course is designed to help students become better teachers and communicators of statistics, and specifically to prepare students to supervise undergraduate statistics students in labs or small group settings, or even to lead their own undergraduate courses. Students learn about and discuss pedagogy in statistics, gain experience with practice teaching, and improve with individual feedback and reflection. Focus will be on skills and best practices for leading a class or a discussion. These are exciting times to be a part of education because our understanding of how people learn is changing based on exciting research that is taking place.

While a final grade will be assigned, we are most interested in your participation in this class. Many of you will have the opportunity to be an instructor of record while at Penn State. We want you to be confident if given this opportunity. Other topics, such as writing an effective syllabus and academic integrity will be addressed after being assigned to teach a class.

Three classes will be taught by research associates from the Schreyer Institute for Teaching Excellence (SITE): [www.schreyerinstitute.psu.edu](http://www.schreyerinstitute.psu.edu). SITE offers many resources to graduate students which go well beyond how to become an effective teacher. Topics include writing a teaching philosophy and preparing the job talk, for example.

One class will be taught by the English for Professional Purposes Intercultural Center (EPPIC): <http://www.eppic.la.psu.edu>. EPPIC is a new research and service initiative designed to provide advanced English language support to the growing international community at Penn State, and to foster dynamic intercultural communication within the larger university community

**TIME & LOCATION:** Thurs 1:35–2:50 PM in 119 Thomas

### INSTRUCTORS:

- Patricia Buchanan, Assistant Teaching Professor and Course Coordinator  
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- Dr. Matthew Beckman, Research Associate & Chair of the Undergraduate Program  
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- Dr. David Hunter, Professor and Department Head  
Office: 326A Thomas      Email: [dhunter@stat.psu.edu](mailto:dhunter@stat.psu.edu)
- Dr. Dennis Pearl, Research Professor & Director of CAUSE  
Office: 412 Thomas      Email: [dkp13@psu.edu](mailto:dkp13@psu.edu)

Right now, our statistics department is one best in the country with regard to expertise in statistical education. So please take advantage of this wealth of information by talking to our faculty members about teaching and learning.

There is a second course that can be taken after Stat 592. This biennial course, Stat 597C: Becoming a Teacher of Statistics, is taught by Dennis Pearl, is an introduction to the literature on innovative courses, pedagogy, content, materials, and tools for teaching statistics. It connects with the national and international Statistics Education communities and provides exposure to leading thinkers and writers who have influenced the teaching of statistics. Best practices and innovative approaches to assessment of important student outcomes and research will be considered.

The Eberly College of Science is also working towards creating a teaching certificate program which would integrate a lot of key components for those who desire to pursue an academic position after graduation.

#### **Other Helpful Resources for Teaching:**

##### **Center for Excellence in Science Education (CESE)**

- Eberly College of Science
- <http://cese.science.psu.edu/>
- There is also a very active STEM teaching group within our college.

##### **Consortium for the Advancement of Undergraduate Statistics Education (CAUSE)**

- A national organization whose mission is to support and advance undergraduate statistics education, in four target areas: resources, professional development, outreach, and research. It is housed in our department.
- <https://www.causeweb.org/>
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##### **The Carl Wieman Science Education Initiative (CWSEI)**

- a multi-year project at the University of British Columbia
- aimed at dramatically improving undergraduate science education with effective evidence-based research
- <http://www.cwsei.ubc.ca/>

#### **Upcoming Conference**

##### **Teaching Conference Spring 2017:**

- Electronic Conference On Teaching Statistics (ECOTS), *Data Science for All*, May 21 - 25, 2018
- Sponsored by CAUSE
- Department will pay registration fee

#### **Longitudinal Study**

**Connolly, M., Savoy, J., You-Geon, L., Hill, I. (2016).** Building a Better STEM Faculty: How Teaching Development Programs Can Improve Undergraduate Education, Wisconsin Center for Education Research, School of Education, University of Wisconsin-Madison.

- <http://lsfss.wceruw.org/finalreport/index.html>

**TABLE 1: SUMMARY OF COURSE REQUIREMENTS AND GRADE BREAKDOWN**

Requirement	General Information/Requirement	Percent of Grade
Practice Teaching 1* (2 minutes)	<ul style="list-style-type: none"> <li>A non-statistical topic</li> </ul>	5%
Practice Teaching 2 (4 minutes)	<ul style="list-style-type: none"> <li>topic from an applied introductory statistics course (descriptive)</li> <li>incorporate three of six GAISE guidelines</li> </ul>	10%
Practice Teaching 3* (4 minutes)	<ul style="list-style-type: none"> <li>Practice teaching 2 improved version</li> </ul>	10%
Practice Teaching 4* (17 minutes which includes a wrap-up)	<ul style="list-style-type: none"> <li>topic from an applied introductory statistics course (descriptive)</li> <li>incorporate an active learning component</li> <li>incorporate three of six GAISE guidelines</li> <li>teach in pairs (randomly assigned)</li> </ul>	15%
Attendance and Participation in in-class discussions*	<ul style="list-style-type: none"> <li>3% for each class</li> <li>bring evaluation forms to class on days for practice teaching</li> </ul>	45%
Complete readings and other assignments before class*	<ul style="list-style-type: none"> <li>self-reflections after practice teaching</li> <li>assigned readings</li> <li>providing other information before class</li> </ul>	15%

\*More than one faculty member will be present on Practice Teaching Days

\*\* Pat Buchanan will be at all classes except one

**TABLE 2: COURSE CALENDAR**

Date	Topic	Due by Beginning of Class
1/11	Introductions: Being a TA: case studies <b>(Pat Buchanan)</b>	Read Case Studies before class
1/18	Practice Teaching 1: Teach something non-statistical/introduction to CAUSE website, <b>(Dennis Pearl)</b>	Prepare to Teach Bring copies of feedback form
1/25	Implementing the 2016 GAISE Guidelines when teaching introductory statistics course <b>(Matt Beckman)</b>	Feedback on Practice Teaching 1 Read posted Gaise Guidelines pages.
2/1	Simulation-based inference (SBI) for learning introductory statistics (modern curriculum) <b>(David Hunter)</b>	Self-Evaluation of Practice Teaching 2 Read Cobb Article Bring Laptop to class
2/8	Practice Teaching 2	Prepare to teach Self-reflection of Practice Teaching 4 Bring copies of feedback form
2/15	Issues Specific for International Students, EPPIC, <b>(Dr. Meredith C. Doran)</b>	TBD
2/22	Practice Teaching 3 (repeat Teaching 2)	Prepare to teach Bring copies of feedback form
3/1	Classroom Management <b>(Schreyer Institute)</b>	Self-Reflection of Practice Teaching 3

3/8	NO CLASS: Spring Break	Safe Travels
3/15	Active Learning ( <b>Schreyer Institute</b> )	Read article in advance
3/22	Practice Teaching 4 (teach in pairs)/half of the class	Prepare to teach Bring copies of feedback form
3/29	Practice Teaching 4 (teach in pairs)/half of the class	Prepare to teach Bring copies of feedback form
4/5	Attributes of a Good Teacher/developing a teaching persona/Feeling like a fake: Overcoming the impostor phenomenon ( <b>Schreyer Institute</b> )	Self-reflection on Practice teaching 4  Self-Evaluation of Attributes of a good teacher reflection
4/12	Teaching Online: ( <b>Whitney Zimmerman, Statistics Department</b> )	Bring laptop to class TBD
4/19	Graduate Student Panel <ul style="list-style-type: none"> <li>• (students previously taught</li> <li>• have TAs who worked with the new Stat 200 curriculum (Stat 200 or Stat 250)</li> <li>• Moderator: <b>Pat Buchanan</b></li> </ul>	Questions for the panel
4/26	Wrap-Up ( <b>Pat Buchanan</b> )	Prepare comments about what learned in each class (each student will be randomly assigned two to talk about to classes)