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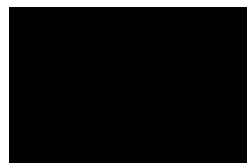


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## United States Conference On Teaching Statistics 2015

The Penn Stater Conference Center Hotel  
State College, Pennsylvania

**"Making Connections" • May 28<sup>th</sup> - 30<sup>th</sup>**

### Tuesday May 26 at 1 p.m. to Thursday May 28 at noon

- Multiday workshops

### Thur May 28

- 1:00 p.m. - 4:00 p.m. Miniworkshops
- 6:00 p.m. - 7:00 p.m. Wine and Cheese/O'dourves Reception hosted by Minitab
- 7:00 p.m. - 8:15 p.m. Opening Session
- 8:15 p.m. - 8:45 p.m. Reception continues

### Fri May 29

- 8:20 a.m. - 8:30 a.m. Welcome
- 8:30 a.m. - 9:30 a.m. Plenary Session #1
- 9:45 a.m. - 10:45 a.m. Posters and Beyond #1
- 11:15 a.m. - 12:30 p.m. Breakout Sessions #1
- 12:30 p.m. - 1:45 p.m. Lunch, including "Birds of a Feather" Groups
- 1:45 p.m. - 2:45 p.m. Plenary Session #2
- 3:00 p.m. - 4:15 p.m. Breakout Sessions #2
- 4:30 p.m. - 5:30 p.m. Technology Demonstrations
- 6:30 p.m. - 8:30 p.m. Banquet and Awards

### Sat May 30

- 8:20 a.m. - 8:30 a.m. Welcome back
- 8:30 a.m. - 9:30 a.m. Plenary Session #3
- 9:45 a.m. - 10:45 a.m. Posters and Beyond #2
- 11:15 a.m. - 12:30 p.m. Breakout Sessions #3
- 12:30 p.m. - 1:45 Lunch, including "Birds of a Feather" Groups
- 1:45 p.m. - 2:45 p.m. Plenary Session #4
- 3:00 p.m. - 4:15 p.m. Breakout Sessions #4
- 4:30 p.m. - 5:00 p.m. Closing Session
- 6:00 p.m. - 8:00 p.m. Dinner (on own, including "Birds of a Feather" groups)

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## United States Conference On Teaching Statistics 2015 Plenary Speakers

### Jim Stigler, UCLA

#### "Teaching for Understanding: What Will It Take?"

##### Abstract

In preparation

##### About the speakers



**Jim Stigler** is Professor of Psychology and Associate Dean of Social Sciences at UCLA. He directed the TIMSS video studies and is co-author of two popular books: *The Teaching Gap* (with James Hiebert, Free Press, 1999) and *The Learning Gap* (with Harold Stevenson, Simon & Schuster, 1992). He received his A.B. from Brown University in 1976, a Masters in Education from the University of Pennsylvania in 1977, and a Ph.D. in Developmental Psychology from the University of Michigan in 1982. Dr. Stigler is best known for his observational work in classrooms, and has pioneered the use of multimedia technology for the study of classroom instruction.

### Roger Peng, Johns Hopkins University

#### "The Role of MOOCs at the University: A Case Study with the Johns Hopkins Data Science Specialization"

##### Abstract

Since the rapid rise of massive open online courses in the public consciousness over 2 years ago, there has been much discussion both inside and outside academic circles of what role MOOCs should play at the university. In particular, there has been discussion of whether the business model can be successful, both for content providers and platform providers, and the extent to which MOOCs can reach an audience that is orthogonal to the University's current audience. The Johns Hopkins Data Science Specialization is a 9-course sequence offered through Coursera by the Department of Biostatistics at Johns Hopkins. Created by three Biostatistics faculty members, it launched in April of 2014 and through December 2014 enrolled a cumulative 1.5 million people. We will discuss the motivation and rationale for creating the series, the design philosophy for the courses and the capstone project, and highlight some successes to date. We will also draw some lessons from the course series thus far and implications for the role of MOOCs at universities more generally.

##### About the speaker



**Roger Peng** is Associate Professor in the Department of Biostatistics at Johns Hopkins Bloomberg School of Public Health. He received a B.S. in Applied Mathematics from Yale and an M.S. and Ph.D. in Statistics from UCLA. His research interests include statistical methods for air pollution exposures, assessing the health effects of climate change, and computational methods for reproducible research. Dr. Peng and his colleagues have developed a data science program offered through Coursera and write the *Simply Statistics* blog ([simplystatistics.org](http://simplystatistics.org)).

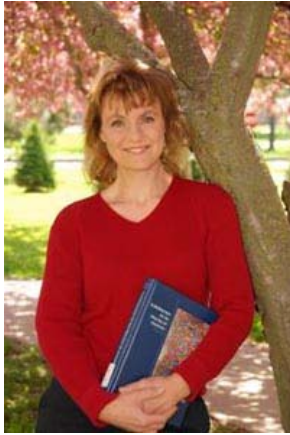
## Shonda Kuiper, Grinnell College

### "Making Statistics Relevant in a Data-Rich Society"

#### Abstract

In our data-rich society, making decisions with data is becoming an essential skill in almost any area of study. Major media outlets have shown evidence of this growing need for data analysis and there has been tremendous growth in enrollments in AP statistics, college statistics enrollments, statistics minors, concentrations and majors. However, at many levels, the statistics curriculum is not representative of actual statistical work. Even after taking a statistics class, many people struggle to connect what they have learned to their own fields. Carefully curated datasets that are brought into the statistics classroom may not feel "real" to students. The result is that core statistical issues such as working with messy data, bias, data relevance and reliability tend to be taught as abstract ideas instead of core concepts essential to every study involving data. We will discuss activities that can be incorporated into traditional statistics courses to prepare the next generation to "think with data" by having them work with real-world, unstructured datasets and train them to better communicate nuanced statistical ideas.

#### About the speaker



**Shonda Kuiper** is an Associate Professor in the Department of Mathematics and Statistics at Grinnell College. She served in leadership roles for the Iowa Chapter of the ASA, the Isolated Statisticians and as chair for the ASA/MAA Joint Committee on Undergraduate Statistics. Dr. Kuiper received a National Science Foundation grant to develop her textbook, *Practicing Statistics: Guided Investigations for the Second Course*, which focuses on bringing interdisciplinary research into the classroom. She is currently working through two additional NSF grants to develop laboratory modules using Web-based games that teach statistical thinking and the process of scientific inquiry. This work has led to the development of Stat2Labs, an educational website that earned a MERLOT Classics Award in 2012.

## Michael Posner, Villanova University

### "Statistics Education Research: It Takes a Village"

#### Abstract

In preparation

#### About the speaker



**Dr. Michael Posner** (<http://www07.homepage.villanova.edu/michael.posner/>) is an Associate Professor of Statistics at Villanova University, where he has been since 2005 after completing his Ph.D. in biostatistics at Boston University. His publications and research span the fields of statistics education research, biostatistics, public health, health care research, statistics and the law, educational research, and analysis of observational studies. Dr. Posner is the Associate Director for Professional Development for CAUSE, is on the Executive Committee of the Section on Statistics Education for the ASA, and is the past-chair of the Special Interest Group of the MAA for Statistics Education. His research has been funded by the National Science Foundation, the Agency for Healthcare Research and Quality, and the Villanova Center for Nursing Research. Dr. Posner has won the 2010 Villanova University Faculty Award for Innovative Teaching, the MAA's 2012 Alder Award for Distinguished Teaching, and the ASA's 2012 Waller Education Award. He is the founding director of the Center for Statistics Education, a Center for Excellence in the College of Liberal Arts and Sciences at Villanova University.

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## United States Conference On Teaching Statistics 2015

### Pre-Conference Workshops

All with free registration and located at the Penn Stater Hotel and Conference Center. If you want to be included on a wait list for a workshop listed as full, please e-mail Lorey Burghard at lfb109@psu.edu

#### Multiple-day Workshops

##### 1. Bringing Passion to your Introductory Statistics Classroom: a supportive, multidisciplinary project-based approach

A 2 day workshop - Tuesday, May 26th at 1 p.m. to Thursday May 28th at noon (includes lunch on Wednesday). A two day workshop taught by Lisa Dierker from Wesleyan University.

Supported by NSF DUE # 1323084

**Abstract:** This two-day workshop will support instructors who teach an introductory statistics or quantitative research course in designing or redesigning any or all portions of their course to engage students in the rich, complicated, decision-making process of real statistical inquiry. Core features of this passion-driven, flipped classroom approach include providing opportunities for students to flexibly apply their statistical knowledge in the context of real data, the use of computing as a window to core statistical concepts, supporting students with varying levels of preparation, and attracting and inspiring students from underrepresented groups.

The workshop will include very brief presentations focused on the nuts and bolts of supporting project-based experiences, followed by ample hands-on opportunities that will be supported by experienced faculty and students. Similar to the approach that will be presented; your experience in the workshop will be individualized to your own interests, background and needs.

Cloud-based SAS Studio, requiring only an internet browser, will be used for the hands-on portions, with materials also available in support of R, Stata and SPSS. Personal laptops are required. For instructors already using a different statistical software tool within their statistics classroom (e.g. Minitab, Statcrunch, etc.), you may bring any appropriate software installed on your laptop for use during the sessions. The workshop is intended for instructors at all levels, regardless of discipline-specific training (e.g. math, statistics, biology, political science, psychology, sociology, education, epidemiology, geology, etc.).

##### 2. Teaching the Statistical Investigation Process with Simulation- and Randomization-Based Inference

A 1.5 day workshop - Wednesday May 27th at 8:30 a.m. ending with lunch on Thursday May 28th (includes lunches) presented by Nathan Tintle, Beth Chance, George Cobb, Allan Rossman, Soma Roy.

Supported by NSF DUE # 1323210

**Abstract:** The goals of this workshop are to help participants to revise their introductory statistics course in two ways:

- Using randomization-based methods, as opposed to methods based on the normal distribution, to introduce concepts of statistical inference
- Emphasizing the overarching process of conducting statistical investigations, from formulating a question and collecting data through exploring data and drawing inferences to communicating results, throughout the course.

The workshop will provide direct experience with hands-on activities designed to introduce students to fundamental concepts of inference using randomization-based methods. The learning activities involve using freely available applets to explore concepts and analyze real data from genuine research studies. The presenters will also offer implementation and assessment suggestions during these activity-based sessions and discussion sessions based on the experiences of the presenters with randomization-based curricula in their own classrooms. More information about the project on which this workshop is based can be found at: [www.math.hope.edu/isi/](http://www.math.hope.edu/isi/).

##### 3. Basics of Data Science in R and R-Studio

A 1.5 day workshop, Wednesday, May 27 (full day) and May 28 (half day, ending at noon) presented by Daniel Kaplan, Macalester College and Nicholas Horton, Amherst College.

Supported by NSF DUE # 0920350

**Abstract:** This workshop is intended to provide an introduction to data science tools and approaches for instructors with a background in R. The goal is to help identify key capacities for instructors and students to "think with data" while answering a statistical question. Key topics will include data wrangling (operations to get data in the right form for graphics), reproducibility, web-scraping, and constructing static and dynamic graphics from data. Suggested background: some background using or teaching with R.

##### 4. Developing and Using Electronic Assessments to Inform Instruction in Introductory Statistics

A 1 day workshop - Thursday, May 28th from 8:30am - 4:00pm (includes lunch), presented by Amy Froelich and Kathleen Rey, Iowa State University.

**Note:** This is a full day workshop, participants registering for this workshop should not register for any of the Thursday afternoon workshops.

Supported by NSF DUE # 1245504

**Abstract:** In this workshop, we will guide participants through the process of developing an electronic assessment model including vocabulary, clicker, and homework assessment questions for the college introductory statistics course (including the Advanced Placement Statistics course). Participants will be given the opportunity to develop their own electronic assessment for a selected topic from the course based on this model. Then, participants will learn how to use software to evaluate student performance on the electronic assessment. At the end of the workshop, participants will leave with the tools and materials necessary (including a database of vocabulary, clicker, and online homework questions) to incorporate electronic assessments into their own introductory statistics courses.

##### 5. Embedding Undergraduate Statistics Courses and Research into a Living-Learning Community

A 1 day workshop - Wednesday at 1 p.m. to Thursday at noon, presented by Mark Daniel Ward, Purdue University.

Supported by NSF DMS # 1246818

**Abstract:** We will focus on ways to effectively embed statistics courses and research opportunities into a living-learning community. We will especially emphasize early statistics courses such as exploratory data analysis, probability, or introduction to statistics. Workshop participants can brainstorm and discuss what kinds of living-learning environments are most appropriate for their own institutions. To aid the participants, we will discuss best-practices for teaching students in ways that reach beyond the classroom. In our NSF-sponsored program in Purdue University's Department of Statistics, we integrate (1) curriculum, (2) research, (3) residential life, and (4) professional development experiences. We will share examples, activities, projects, syllabi, calendars, and research topics from our initiative at Purdue. We will include elements about how to integrate computational aspects into a living-learning community, in ways that increase the student comfort level. Throughout the workshop, we will link student successes in the statistics curriculum with their living, research, and professional development experiences.

##### 6. Teaching Data Science

A 1 day workshop - Wednesday at 1 p.m. to Thursday at noon, presented by Chris Malone, Winona State University.

**Abstract:** The Teaching Data Science workshop is intended for instructors in statistics, mathematics, or computer science who have an interest in incorporating data science type curriculum into their existing courses. Participants who complete this one-day workshop will:



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- Learn basic data science methods to complete common tasks conducted by practitioners,
- Work through several classroom ready handouts that have been used in teaching data science at Winona State University, and critique and discuss the incorporation of the workshop handouts into your existing courses..

The curriculum for this workshop was developed by faculty teaching in the data science program at Winona State University. Workshop participants should be familiar with spreadsheets and basic knowledge in R is encouraged, but not required.

## Thursday May 28th - Half-Day Afternoon Workshops

### 7. A Flipped Classroom approach to Introductory Data Science

A 3-hour workshop, Thursday, May 28 from 1 to 4 pm, presented by Lillian Cassel and Michael Posner, Villanova University.

Supported by NSF DUE # 1432257

**Abstract:** This workshop will explore ways of incorporating topics in Data Science into existing courses as well as approaches for presenting Data Science topics in Flipped Classroom mode. Participants will experience the Flipped Classroom mode as they consider goals and topic areas for an introductory data science course. Following, they will discuss instructional issues related both to the flipped classroom and data science. Participants will leave the workshop with a listing of learning goals, central data science topics, content modules, and a framework for implementing a flipped classroom approach to introduce data science to students with limited technical backgrounds.

The presenters are NSF-funded investigators on a collaborative team of computer scientists and statistician to create flipped material for an introductory data science class.

### 8. Exercises for teaching statistics with simulations, resampling methods, and big data (Hosted by JMP)

A 3-hour workshop preceding, Thursday May 28 from 1 - 4 pm, presented by Mia Stephens and Julian Parris, JMP Division of SAS Institute; Dick De Veaux, Williams College; and Brant Deppa (Winona State).

**Abstract:** In this workshop we will provide a series of exercises using simulations, resampling methods and interesting (and big) data sets for teaching and exploring statistical concepts in the classroom. We will explore how these exercises can lead to better comprehension and retention of statistical ideas, and students who are more statistically literate and more engaged in the exploration of statistical questions. We'll close with a discussion of best practices for integrating exercises and cool data into the classroom.

### 9. Engaging Intro Statistics Students with Activities (Hosted by Minitab)

A 3-hour workshop preceding, Thursday May 28 from 1 - 4 pm presented by Dr. Diane Evans and Dr. Eric Reyes, Rose-Hulman Institute of Technology

1:00-2:15 – Workshop  
2:15 -2:30 – Break  
2:30-3:45 – Workshop  
3:45 -4:00 – Q&A

**Abstract:** Students become motivated and excited to learn statistical concepts when the course includes in-class labs with data that they generate themselves. The five to ten minutes that students spend obtaining activity data at the beginning of the class period is well worth their increased enthusiasm in analyzing and answering questions about it. In this workshop, web-based games (e.g., Sheep Reaction, The Impossible Quiz, Red Block Flight Simulator) and other materials (e.g., straw rockets, ruler hockey sticks, plastic volumeters, thermometers) will be demonstrated that introduce students to statistical methods from a variety of disciplines. The materials introduced in this workshop encourage students to experience collecting their own data from a real process and to use statistics to investigate a question with no known answer. For example, is the volume of a person's dominant hand the same volume as that person's non-dominant hand? Before we can even start collecting data to determine an answer, we must grapple with defining a person's "dominant hand." These real-world problems encourage students to see how statisticians approach answering a statistical question, as well as incorporate statistical thinking in their own fields of study.

Before we have an activity day, the statistical theory and data analysis techniques arising from that activity will have already been discussed with the students in a face-to-face or online environment. Before coming to college, many high school and community college students used graphing calculators or Excel to do data analysis. Minitab's ease of use makes it ideal for analyzing data in a short classroom period, while providing students with a real-world skill for their resume.

This workshop will provide materials (tiny plastic pigs, dice, puzzles, pig poppers) that can be used for data collection activities in an introductory statistics course. Several activities will be introduced in which participants will generate data just as their students would. We want participants to have the total experience of performing an activity, interacting with their workshop classmates, generating data, inputting data into Minitab, and choosing the appropriate statistical functions to answer a given question. Because we will have participants analyzing data with Minitab in this workshop, we encourage them to bring a laptop or share one with a workshop classmate.

The time and money required for participants to prepare these activities for their own classrooms is minimal. We will provide participants with a list of these activities and data analysis problems to accompany them. After participating in the workshop, participants will have gained first-hand experience with several activities used to promote active-learning in the classroom. We believe that personal connections and one-on-one time with students during class can have a tremendous impact on the way students engage with the statistical concepts developed in courses.

### 10. Using LaunchPad in Introductory Statistics Courses for Online Homework and Assessment (Hosted by WH Freeman)

A 3-hour workshop preceding, Thursday May 28 from 1 - 4 pm, presented by Karen Carson, WH Freeman.

**Abstract:** Join WH Freeman as we present a deep dive into our new course management system, LaunchPad. Learn how to set up a course, create homework assignments, manage students individually, customize your online resources, and more. Whether you currently use a WH Freeman text or not, please take this opportunity to see how advanced, intuitive, and time-saving teaching with our Launchpad can make your courses!

### 11. Modules for Teaching Statistics with Pedagogies using Active Learning (MTStatPAL) as a part of a Flipped Classroom Model

A 3-hour workshop preceding, Thursday May 28 from 1 - 4 pm, presented by Ginger Rowell, Middle Tennessee State University.

Supported by NSF DUE # 1245393

**Abstract:** The workshop participants will examine best practices for using active learning in the introductory statistics course to increase student engagement which can be evidenced by rich statistical conversations among students. To facilitate this dialog, the workshop participants will experiment with the Modules for Teaching Statistics with Pedagogies using Active Learning (MTStatPAL) resources that can be incorporated in a flipped classroom model to foster active learning during class as well as active learning outside of class. Each MTStatPAL module each contains an in-class activity that guides students to discover important statistics topics along with a pre- or post-class video with embedded quizzes for the students complete independently. Participants will also review some of the extensive instructor support materials for these modules that are designed to help teachers without experience using active learning to be successful using the materials.

### 12. Making the most of StatCrunch in your introductory statistics course (Hosted by Pearson Higher Ed)

A 3-hour workshop preceding, Thursday May 28 from 1 - 4 pm, presented by Webster West, North Carolina State University.

**Abstract:** StatCrunch is a unique statistical software package that offers extensive data analysis capabilities along with a number of features that can be used for statistical education. This workshop will focus on how to use these pedagogical features to make a significant impact on the teaching of an introductory statistics course. Topics to be covered will include applets for teaching statistical concepts, surveys for collecting student data in class and online reports for student projects. StatCrunch's ability to easily pull data into the classroom from web-based data sources such as social media will also be discussed. Teacher's completing the workshop should be well armed with a number of tools that can be easily incorporated into their courses.

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