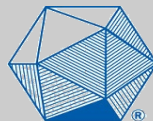


March 16,  
2020

# StatPREP



# MAA

MATHEMATICAL ASSOCIATION OF AMERICA

## NEWSLETTER

### STATPREP: OUT & ABOUT

BY MIKE BRILLESLYPER

In the February 2020 StatPREP newsletter we highlighted recent conference presentations and workshops featuring StatPREP or StatPREP materials. In this month's article, we want to highlight upcoming dissemination events and encourage StatPREP participants to help get the word out.

Tentatively planned upcoming events include a joint presentation by hub leaders at **AMATYC 2020** in Spokane WA, a poster presentation at **Mathfest 2020** in Philadelphia, a possible workshop at **USCOTS 2021** at Penn State, and a minicourse at **JMM 2021** in Washington DC.

Regional MAA and AMATYC affiliate meetings are great opportunities to speak to your colleagues about StatPREP, the many resources available, and how they too can make their stats courses more data-centric.

The complete lists of regional and affiliate meetings can be found on the MAA and AMATYC websites (links at the bottom of this article). Many of these meetings occur in March and April so there is still time to submit an abstract. In addition, the American Statistical Association (ASA) hosts a variety of meetings and conferences, including a new conference focused on data science.

If going to a conference or meeting is not possible, you can also consider talking about StatPREP at your own institution. Giving an informal talk to colleagues is an easy way to engage other faculty members in StatPREP and the broader discussion about modernizing introductory statistics. If you do give any type of presentation on StatPREP, please let your hub leader know and take pictures! We would love to highlight your efforts in a future newsletter.

#### REGIONAL & AFFILLATE MEETINGS:

[AMATYC Affiliate Meetings](#)

[MAA Section Meetings](#)

[ASA Meetings](#)

#### WHO'S WHO:

##### LEADERSHIP TEAM

Mike Brilleslyper,  
Air Force Academy

Jenna Carpenter,  
Campbell University

Danny Kaplan,  
Macalester College

Kathryn Kozak  
Coconino Community  
College

Donna LaLonde,  
ASA

Ambika Silva  
College of the Canyons

Rachel Levy  
MAA

##### HUB LEADERS

Joe Roith, St. Olaf's Col-  
lege, Northfield, MN (2017-  
18)

Ambika Silva, College of the  
Canyons, Santa Clarita, CA  
(2017-18)

Helen Burn, Highline Col-  
lege, Seattle, WA (2018-19)

Hwayeon Ryu, Elon Univer-  
sity, Elon, NC (2018-19)

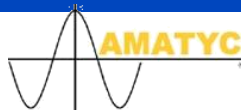
Carol Howald, Howard Com-  
munity College, Columbia,  
MD (2019-2020)

Thomas Kinzeler, Tarrant  
County College, Fort Worth,  
TX (2019-2010)

Rona Axelrod, Florida SW  
State College, Fort Myers,  
FL (2020-2021)

Brooke Orosz, Essex Coun-  
ty College, Newark, NJ  
(2020-2021)

Support for this MAA Program is provided by NSF DUE-1626337



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# DISCOVERING STATPREP.ORG -

## MAA CONNECT

BY AMBIKA SILVA

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Want to join the conversations StatPREP participants are having? Looking for ideas and ways to invigorate your Intro Statistics course? The MAA has a way for StatPREP participants to stay in contact, share materials, and collaborate. It is called MAA Connect. The StatPREP.org website has many resources to get you started using this exciting new platform!

The website for MAA Connect is: <https://connect.maa.org/home>.

The StatPREP community has over 100 members, lots of discussions, and more to be had!

### [StatPREP Hub Communities](#)

The StatPREP Grant facilitates community learning through professional development and small workshops. This community is for hub participants, past and present, to have discussions about relevant topics. If you are a previous HUB participant or interested in the conversation, please email [statprep@maa.org](mailto:statprep@maa.org) for access to the community.

Discussions 103

Libraries 13

Members 106

admin last person joined 2 days ago

You do not need to be a member of MAA to join the StatPREP Hub Communities. Once you join the group, StatPREP Hub Communities, you can post discussion topics and share materials.

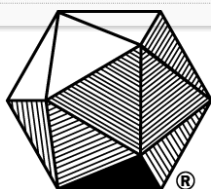
*....continued on page 4*

# DISCOVERING STATPREP.ORG Continued...

## Join the Discussion!

Recent discussions we are having include the Coronavirus Outbreak and the latest research on the average body temperature not being 98.6°F. There are also discussions on more general topics such as standard deviations from a histogram, and StatPREP specific discussions on how to incorporate StatPREP materials. Have something to ask or add to the conversation? Join MAA connect today to join the dialog!

The screenshot shows the StatPREP Hub Communities interface. At the top, there is a header with the text "StatPREP Hub Communities" and a "Settings" button. Below this is a navigation bar with "Community Home", "Discussion 103", "Library 13", and "Members 106". The main content area is divided into two columns. The left column is titled "Latest Discussion Posts" and lists five discussion threads: "RE: Corona Virus Data" (by Ambika Silva), "RE: Body temperature not 98.6 degrees?!?" (by Ambika Silva), "RE: Corona Virus Data" (by Jennifer Ward), "RE: Body temperature not 98.6 degrees?!?" (by Jennifer Ward), and "Body temperature not 98.6 degrees?!?" (by Ambika Silva). The right column is titled "Latest Library Files" and lists three files: "Getting Standard Deviation from A Histogram" (by Nicholas Jacob, one month ago), "Using 'What's Normal?' Little App in a discussion (improvements ...)" (by Jennifer Ward, 4 months ago), and "Sample Syllabus" (by Kathryn Kozak, 7 months ago). The "Using 'What's Normal?'" file includes a description: "This is an activity I use in my online classes that uses the Little App 'What's Normal'." and a link to a Google Docs document.



# MAA CONNECT

## Need Help Joining?

[Getting Started Guide](#)

[Getting Started Video](#)

[StatPREP October Webinar](#)

# RESOURCE HIGHLIGHT: DATA 8

BY DONNA LALONDE

“Use the combination of CS + Stats as a feature, not a bug” is one of the core concepts/ inspirations for the Foundations of Data Science course offered for first-year students at Berkeley. In this resource article, I want to highlight these “Data 8” resources.

Foundations of Data Science is described as “(listed as COMPSCI/STAT/INFO C8 and commonly called “Data 8”) is a course that gives you a new lens through which to explore the issues and problems that you care about in the world. You will learn the core concepts of inference and computing, while working hands-on with real data including economic data, geographic data and social networks.” The course materials are available at <http://data8.org/>. Included in the publicly available resources are the lecture videos from the Fall 2016 course offering so you can see the course in “action.”

The textbook for the Data 8 course is [Computational and Inferential Thinking: the Foundations of Data Science](#) by [Ani Adhikari](#) and [John DeNero](#) is freely available under a Creative Commons license. The book has 18 chapters including a chapter - “Programming in Python” which is the language used throughout the book. In the first chapter, the overarching themes of the book are introduced by investigating the statistics of two classics - The Adventures of Huckleberry Finn by Mark Twain, and Little Women by Louisa May Alcott. The Python code is included but the emphasis is not on understanding the code but rather on interpreting the results which provides an engaging introduction to both the themes of the book and the computational skills that will be developed.

This excerpt from the introduction previews the topics explored in subsequent chapters -

“One of the most important contributions of statistics is a consistent and precise vocabulary for describing the relationship between observations and conclusions. This text

continues in the same tradition, focusing on a set of core inferential problems from statistics: testing hypotheses, estimating confidence, and predicting unknown quantities.” The text also includes chapters on visualization and classification.

The curricular resources are complemented by [Zero to 8](#) a guide for developing your version of the course. This guide explains both the technological and pedagogical foundations of the Data 8 course.

“Intersectionality is a feature, not a bug” is a theme throughout Data 8 and there are a rich collection of resources to explore.

## SAVE THE DATE!

### Summer 2020 StatPREP Workshops

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Fort Myers, FL: May 29 - 30, 2020, Florida Southwestern State College

Fort Worth, TX: June 3 - 4, 2020, Tarrant County College

New Jersey: June 5 - 6, 2020, Essex County College

Columbia, MD: June 12-13, 2020, Howard Community College

# BOOK REVIEW: *FACTFULNESS*

BY DANIEL KAPLAN

*Factfulness: Ten Reasons We're Wrong about the World -- and Why Things Are Better Than You Think*

Hans Rosling with Ola Rosling and Anna Rosling Ronnlund  
FlatIron Books 2018

Hans Rosling is the world's most famous global health physician. You may have seen his TED talks that feature beautifully informative bubble charts of health and related statistics as they vary among countries and evolve over time. I've met many statistics educators who use Rosling's graphics as a way to amp-up student interest in data and graphics.

In his work, Rosling has discovered that supposedly well educated people are stunningly ignorant about basic facts and trends of global health and material wellbeing. This includes audiences of Nobel laureates, international bankers, the Davos elite, medical students, who consistently do worse than random in answering straightforward multiple-choice questions about demographics and life expectancy around the world and the availability of vaccination, education, electricity, and other factors that have featured in 200-year transition from the lives 17th century philosopher Thomas Hobbes summarized as "poor, nasty, brutish, and short."

There's a lot to learn in *\*Factfulness\** about global health, for example why roads are more important than

hospitals and why a substandard level of hospital care can be optimal. But

*\*Factfulness\** is mainly

about ten cognitive biases that underlie the epidemic of misconception about the actual facts of health of the global population.

Many of these biases--Rosling calls them "instincts"--are profoundly related to what the readers of this newsletter do: teach statistics and calculus. Indeed, the first chapters of *\*Factfulness\** can be read as a places-to-visit guidebook for statistics and calculus. Keep in mind as you read the following that Rosling's career as an educator has involved elites: medical students, TED audiences, Davos.

Chapter 1 discusses an unfortunate tendency to see stark gaps even when the reality is subtle shades of difference. He writes, "When we compare two averages, we risk misleading ourselves even more by focusing on the gap between those two

**Want more StatPREP? Check out:**

**<http://statprep.org/>**



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## BOOK REVIEW: *FACTFULNESS* Continued...

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single numbers, and missing the overlapping spreads, the overlapping ranges of numbers that make up each average. That is, we see gaps that are not really there." Our statistics curriculum is largely about differences in means. Of course this can be appropriate for certain purposes, but typically our curriculum doesn't dwell on actual purpose, preferring glib formulations like "the mean is representative of the population." I want to know, who elected the mean? If we're interested in representation, why focus on a single number?

Chapter 2 deals with the paradox that a large majority of tens of thousands of people who took Rosling's global health quiz think that the world is generally getting worse on those measures where, in fact, there has been dramatic and unprecedented progress. He finds that people have a hard time separating two ideas that should be distinct: being bad and getting bad.

The author F. Scott Fitzgerald famously wrote: "The test of a first-rate intelligence is the ability to hold two opposed ideas in mind at the same time and still retain the ability to function." Or, as Rosling frames it, "Better and bad, at the same time." I'll wager that many of the people Rosling has observed failing to distinguish between better and bad have taken calculus. Perhaps Rosling's examples can help us teach calculus in more motivating settings where students can see that better and bad are different things.

Chapter 3 is "the straight-line instinct." The message: don't imagine a linear function when it isn't there. His examples are motivating. For example, dental health as a function of income has an upside-down U shape. The very poor have reasonable dental health (not much exposure to sugar) and the very wealthy (good dental care) but not the people in between. In the statistics curriculum, however, the straight-line function is king.

Trying to account for people's fear of situations that are not at all dangerous, the book's chapter four introduces a well-known public health framework for anticipating unwarranted fears. "Fear factors" include features of risk such as invisibility (think radiation, COVID-19), lack of control (think passenger on a plane as opposed to the much more lethal driving a car), impact on children, etc. Quantitative evaluation of risk is the way to tame fear, which should be an easy fit in a statistics curriculum. But you may have to put political beliefs in the drawer while you teach so that you can talk accurately about the radiation from Chernobyl or Fukushima or the actual risks of GMO foods, or why banning DDT makes rich people feel good while killing the poor.

The "size instinct" discusses three simple practices in quantitative hygiene: compare, 80/20, and divide.

\*Factfulness\* could reasonably be called a statistics textbook. It's all about making sense of data. But rather than being about the ways that statisticians can play in everybody's back yard, the arena is the world as a whole and the well-being of its inhabitants.





# UPCOMING EVENTS

## SPRING WEBINARS

**FRIDAY, MARCH 13**

**11 AM EDT**

*\*Rescheduled from February 27\**

*Course Curricula & StatPREP*

**Hosts: Kate Kozak & Danny Kaplan**

Danny Kaplan and Kate Kozak will introduce the three new StatPREP companion tools for statistics Using Technology by Kozak, OpenIntro Statistics by Diez, et al, and Elementary Statistics by Triola. Do you use one of these books in your introductory statistics classes? If so, register for the webinar to learn how StatPREP can help you teach data-centric statistics. If you don't use these books, you can still learn where the StatPREP material can be used with your textbook.

**THURSDAY, MARCH 26**

**1 PM EDT**

*The p-value: Replacing 0.05 with Understanding*

**Host: Kari Lock Morgan**

The American Statistical Association's 2016 P-Value Statement and The American Statistician's 2019 special issue "Statistical Inference in the 21st Century: A World Beyond  $p < 0.05$ " both provide a call for action and change regarding how p-values are taught and used. In particular, they discourage the focus on whether a p-value is less than a specific threshold (e.g. 0.05), and encourage a better understanding of what the p-value actually represents. This talk will discuss ways to replace " $p < 0.05$ " with conceptual understanding of a p-value in introductory statistics courses .

Each webinar is recorded and posted on the [StatPREP website](#) so that you can view previous webinars.



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# MORE UPCOMING EVENTS

## SPRING WEBINARS continued...

**THURSDAY, APRIL 23**

**1 PM EDT**

*Little App Update!*

Hosts: Jennifer Ward & Danny Kaplan

We're approaching the third anniversary of the StatPREP Little Apps. To celebrate, we're launching a brand new set of Apps with a new look and new functionality. Among the changes are a dramatically increased choice of data sets (including those keyed to textbooks often used by StatPREP instructors), the ability to upload your own CSV files, a feature that lets you freeze a display and show it side-by-side with the current display. The original apps will continue to be available at their current web addresses, but we think you'll want to switch to the new ones to benefit from their new capabilities.

**MONDAY, MAY 18**

**3:30 PM EDT**

*What Every Instructor Should Know About the Bootstrap*

Hosts: [Tim Hesterberg](#) & Kate Kozak

Statistical concepts such as sampling distributions, standard errors, and P-values are difficult for many students. It is hard to get hands-on experience with these abstract concepts. I think a good way to get that experience is using bootstrapping and permutation tests. I'll demonstrate using a variety of examples.

Though bootstrapping has enormous potential in statistics education and practice, there are subtle issues and ways to go wrong. For example, the common combination of nonparametric bootstrapping and bootstrap percentile confidence intervals is less accurate than using t-intervals for small samples, though more accurate for larger samples. My goals in this talk are to provide a deeper understanding of bootstrap methods--how they work, when they work or not, and which methods work better--and to highlight pedagogical issues.

