THE UNIVERSITY OF GEORGIA

DEPARTMENT OF STATISTICS

AND

THE STATISTICS CLUB

jointly present

The Bradley Lecture

Friday, April 18, 2025

Brooks Hall 145 | Founders Memorial Garden **4:00 pm**

Registration Fee: $25 for non-members, $5 for members

Dr. Daniela Witten

Department of Statistics
University of Washington

INFERENCE ON A SINGLE REALIZATION OF A NETWORK

Given a dataset consisting of a single realization of a network, we consider conducting inference on a parameter selected from the data. For instance, suppose that we perform community detection to identify sets of nodes with generally similar connectivity patterns. Inference on the connectivity within and between the estimated communities poses a challenge, since the communities are themselves estimated from the data. Furthermore, since only a single realization of the network is available, sample splitting is not possible. In this talk, I will show that it is possible to split a single realization of a network consisting of n nodes into two (or more) networks involving the same n nodes; the first network can then be used to select a data-driven parameter, and the second to conduct inference on that parameter. In the case of weighted networks with Poisson or Gaussian edges, we obtain two independent realizations of the network; by contrast, in the case of Bernoulli edges, the realizations are dependent, and so extra care is required. We establish the theoretical properties of our estimators, in the sense of confidence intervals that attain the nominal (selective) coverage, and demonstrate their utility in numerical simulations and in application to a dataset representing the relationships among members of a karate club.

▪ *About the Speaker* ▪

Daniela Witten is a professor of Statistics and Biostatistics at University of Washington, and the Dorothy Gilford Endowed Chair in Mathematical Statistics. She develops statistical machine learning methods for high-dimensional data, with a focus on unsupervised learning.

She has received a number of awards for her research in statistical machine learning: most notably the Spiegelman Award from the American Public Health Association for a (bio)statistician under age 40, and the Presidents' Award from the Committee of Presidents of Statistical Societies for a statistician under age 41.

Daniela is a co-author of the textbook "Introduction to Statistical Learning", and since 2023 serves as Joint Editor of Journal of the Royal Statistical Society, Series B.

▪ *History of the Bradley Lecture* ▪

The University of Georgia Department of Statistics and the Statistics Club are proud to host the 30th Annual Bradley Lecture. The event honors former faculty member Dr. Ralph A. Bradley, who was born on November 28, 1923 in Smith Falls, Ontario, Canada, and who grew up in the village of Wellington. After graduating from Queen's University in 1944 with an honors degree in mathematics and physics, he served in the Canadian Army from 1944 to 1945, and afterwards earned his Masters of Arts degree in 1946. He received his PhD in 1949 at the University of North Carolina Chapel Hill, and went on to a very distinguished career. He was founder of the Department of Statistics at Florida State University and served as its chair from 1959 to 1978. He joined UGA in 1982.

Dr. Ralph Bradley made many contributions to the field of statistics as a researcher in design of experiments, nonparametric statistics, sequential analysis and multivariate analysis. He also had an exemplary record of service to the profession of statistics as a member of ASA, IMS, ISI, as well as by serving as a president of ASA in 1981.

The Bradley Lecture provides an opportunity for UGA graduate students to interact with the speaker, who is normally an eminent statistician of their choice. After the seminar in the afternoon, the speaker gives an after-dinner presentation and often stays for the next day's spring picnic to mingle with faculty and students.

We hope you'll join us for what should be an informative and exciting event!

▪ *Schedule of Events* ▪

Friday, April 18, 2025

3:30pm – 4:00pm
Arrival
Brooks Hall 145

4:00pm – 4:05pm
Opening remarks

4:05pm – 5:00pm
Lecture
Dr. Daniela Witten
University of Washington

5:00pm – 5:30pm
Break

5:30pm – 7:00pm
Dinner
Founders Memorial Garden

7:05pm – 7:45pm
After Dinner Talk
Dr. Daniela Witten
Brooks Hall 145

Registration Fee: $25 for non-members, $5 for members
"Please contact Andrew Mosbo (Andrew.Mosbo@uga.edu) with questions regarding payment methods."

▪ *After-Dinner Talk* ▪

Dr. Daniela Witten
Brooks Hall 145 | 7:05 PM

SELECTIVE INFERENCE FOR REAL-WORLD PROBLEMS

Statistics textbooks typically assume that the data analyst has chosen a hypothesis to test or a confidence interval to estimate before looking at the data—or, better yet, before they have even collected it! However, in reality, statistical practice often proceeds quite differently: an analyst may first explore the data in order to come up with a statistical question that seems "interesting" and then use the same data to answer that question.

This practice is often described as "double dipping." Unfortunately, classical statistical machinery does not apply when we have double dipped: for instance, hypothesis tests will reject the null hypothesis far more often than they should, and confidence intervals will not cover the parameter of interest. This leads to spurious findings that will not hold up in future studies.

In this talk, I will discuss recent developments that enable valid inference with double dipping. I will present the conditional selective inference framework as well as sample splitting and its variants. These ideas will be motivated using an application to single-cell RNA sequencing.

▪ *Bradley Spring Picnic* ▪

Sandy Creek Park | Shelter #2
Saturday, April 19th, 2025 | 10:00am – 2:00pm

Enjoy a relaxing afternoon full of food, fun, and fellowship!
All friends and family of the department are welcome as well,
so come mingle with the faculty members and graduate students
while the students show off their outdoor grilling skills!