Practical Significance | Episode 55: Forward Stats—Frontiers of Statistics in Science and Engineering: 2035 and Beyond

Donna LaLonde: Well, welcome everyone. We are really delighted to be joining you again for the July episode of Practical Significance. And we have three wonderful friends with us. And so, this is going to be a great opportunity for Ron and I to have a conversation with Lance, Kathy, and Brittany. And we are going to start as we always do by asking our guests to tell us a bit about their day job, and then we'll get into the topic at hand. So, Lance, I'll start with you. What's your day job?

Lance Waller: I'm Lance Waller. I'm a professor in the Department of Biostatistics and Bioinformatics in the Rollins School of Public Health at Emory University. Thanks.

Donna LaLonde; And Kathy, you're a familiar guest, but we'll have you tell us about your day job anyway.

Kathy Ensor: My day job just bleeds into my night job, into my 24-7 job, it seems like. I am the Noah G. Harding Professor of Statistics at Rice University, where I've spent my entire career. And the unique thing about our department is we sit in a school of engineering. And so, it's been really fascinating being a statistician in a school of engineering throughout my career. And I was the 2022 president of ASA, championing ASA in our community. Thanks very much.

Donna LaLonde: And we're joined by Brittany, our colleague from the National Academies. And the reason that we are together is that Lance and Kathy are co-chairing a study from the National Academies, Frontiers of Statistics in Science and Engineering, 2035 and beyond.

So, Brittany, we know that you are supporting this effort. So, we'd like to hear a little bit about your day job, including your work with the Committee on Applied and Theoretical Statistics, or lovingly known as CATS. But then if you'll also tell us a little bit about why the National Academies convened this study, we'll dig into a bit more. So, Brittany, over to you.

Brittany Segundo: I'll start by giving a bit of context about the National Academies of Sciences, Engineering and Medicine and what we do. We were founded in 1863 during the Civil War as a non-governmental, non-partisan entity to advise the government on questions of scientific, engineering and medical matters of national inquiry.

We're broadly known for our honorific societies, but we also have this really robust research arm called the National Research Council. And that's where I work under the NRC on the Board of Mathematical Sciences and Analytics. In this capacity, I direct CATS, where

we translate state-of-the-art statistics and analytics research to policy questions across a variety of domains.

One thing the Research Council is really known for is their consensus studies. These tend to be reports that respond to a statement of task or a charge and provide key messaging and potentially even recommendations to sponsors and federal agents. This project that we're working on right now, the Frontiers of Statistics, is a consensus study.

Our hope for the Frontiers of Statistics study is that it is a landmark assessment of the field. Other disciplines take advantage of these sorts of opportunities to routinely assess their domains. We see this a lot at the National Academies within astronomy and within physics. And we're very excited to do something similar for the field of statistics.

We broached the idea of doing a forward-looking assessment of the statistical sciences with our federal contacts. And they seem to have a real appetite for a study of this magnitude and this scope. So we are very fortunate to be sponsored by a diverse array of offices across NSA, NIH, and NSF. And at NSF in particular, we're funded by six different directorates, including: mathematical and physical sciences; computer and information science and engineering; biological sciences; engineering; geosciences; and STEM Education.

So, this is very much a cross-disciplinary effort looking at the field of statistics and its broad impact.

Ron Wasserstein: Thanks, Brittany. We really appreciate that. I have a question now for Lance and Kathy, who already have really full professional lives and also knew when asked to take on leadership of an academy study that it's a major commitment. So, my question is, what were you thinking? No, my actual question is, why were you willing to take this on? Why is this so important that you're willing to set aside other things like, say, sleep in order to lead this project?

Lance Waller: Kathy and I are big advocates for the field of statistics and all its many forms and all the ways it interacts. I think Brittany's list of sponsors is a really impressive list of groups that identify that statistics is important to them. Both Kathy and I have been members of the CATS committee. before and I'm fortunate to serve as its co-chair right now with Liz Stewart at Johns Hopkins.

CATS is one of two statistics committees in the National Academies. The other is CNSTAT, the Center for National Statistics, which focuses on the federal statistical infrastructure

and data infrastructure like the Census Bureau of Labor Statistics. And CATS in some ways can be classified as the rest.

It's usually not part of ongoing things, but there's a lot of data collected for a lot of reasons, whether that's meteorologic data or fisheries data, a lot of interesting components. And these are challenging questions that are really fun to think about. I've enjoyed my time as a member of CATS and then in the leadership of CATS, having federal groups reach out to us with questions about data and then having a collection of 12 to 15 people sit around and think and make recommendations on what they should try next.

When this opportunity came up in talking to David Mandershine at NSF and the Director of Math Sciences, we were really excited about trying to identify individuals of a broad range of experience and interests in different aspects in statistics. And it just seemed like, A, it would be a lot of fun. And then second, the academy staff like Brittany are fantastic at organizing, keeping us on task, reminding us of the goals and the difference between finding and a recommendation. And it's a lot of work, that's for sure. But it's a delight to get to know people in this kind of environment where you get to sit and think around what direction is our field moving and where is it going? I'm sure Kathy can add to that.

Kathy Ensor: Lance and Brittany actually brought the study to fruition and then invited me to join. And so, it was a wonderful opportunity. And so why do this? It's clear that our day-to-day lives are changing very rapidly at the moment, but center to all of that is the strength of our discipline and what we bring to the world every day. This brings us an opportunity to really focus that conversation on science and technology and where it's going, the frontiers, what's happening, what's new on the horizon. How much fun to think about things like that with such an amazing group of people. And so that is the why. It is a lot of work. There is no doubt. And we still have a lot ahead of us. We're maybe halfway through this process. And so lots of time for additional input from our community.

One challenge with this is our community, our field is really dynamic. There's always discussions on what's next. And so there've been a lot of similar reports, different aspects. The 2019 statistics that across wrote other training workshops and round tables and trying to pool that is really challenging. We did some background reading on things as recently as a year or two ago on what the frontiers were. And it's hard to do a frontiers report and not have it sound dated very quickly.

One of our goals was to look ahead in this 10-year period. And we hope our community feels like we're both recognizing the other groups that have been thinking about this and writing about it but also representing those who will be thinking about it next year.

It is interesting how our profession is really always forward looking. We are a very forward-looking society and group of scientists. And I think that's why we evolve as society's needs for us evolve.

Donna LaLonde: Thanks, Lance and Kathy. And we'll be sure to highlight all of the places in which our listeners can provide input. We know that there's some information collection on the National Academy site and we'll point folks to that. But Brittany, I'm hoping that you'll give us a little bit of a behind the scenes look at the frontiers of statistics in science and engineering 2035 and beyond. And tell us a little bit about how you have been gathering input to date and what's on the horizon for you.

Brittany Segundo: So the first step of any activity at the National Academies is to assemble a committee. And it is the biggest privilege, and my favorite part of the job is working with people like Kathy and Lance and assembling these diverse committees of leaders in the field.

For this committee, that includes: Rena Barber from the University of Chicago; Amy Braverman from NASA's Jet Propulsion Lab; Lauren Crawford from Microsoft Research; David Dunson from Duke; Omar Gatos from UT Austin; Frauke Kreuter from the University of Maryland College Park, as well as the University of Mannheim; Ji Hong Lin from Harvard; Brian Rich from NC State; Steve Sain of Jupiter Intelligence; Artie Singh from Carnegie Mellon; Daniela Witten from the University of Washington; and Tian Zhang from Columbia.

Once we have our committee assembled, we begin with a very aggressive information gathering campaign to understand the scope and breadth of our field. So in this case, we've hosted a number of panels. And by the way, these are all open to the public. Anyone is welcome to join and listen in. Some of the panels we've hosted for this study include: panels on causal inference; trends in statistical journals; privacy; and precision agriculture.

We're looking at statistics at all the frontiers. And then as we write the report, there tends to be a second wave of information gathering where we realize, oh, there may be a gap here where we could explore a little further. Or I have a question I need answered. These tend to be less panel focused and more this person might know more about this and can help guide us. And those too are open to the public.

And then this is something we're doing uniquely for this study. We want to hear about anyone in the audience right now, whether you're a student or a dean or a professor or a practitioner, however you're intersecting with the field of statistics. We want to hear what you are working on and how you are pushing the frontiers. So that is on our website. It's an open call for perspectives.

Because what we want to do is really represent what's happening in the field. This is not about my thoughts or Kathy's thoughts or Lance's thoughts. It's really looking at what is happening and capturing the trends for the field and where it's headed. So that's what our information gathering looks like.

Ron Wasserstein: Thanks, Brittany. It's both really important too and really hard to think about 2035 right now, isn't it? One of the things I think about with regard to 2035 is that how much I'd like to be in it. So, we'll see how that goes. But if you're fast forwarding, Lance and Kathy, and Kathy May will start with you. If you're fast forwarding to 2035 and there's one like statistical development or application that you hope will have been realized then, what would that be and why?

Kathy Ensor: Ron, I think I'm going to answer that a little bit more broadly rather than focusing on just one aspect but maybe focusing a little bit on our profession and how we evolve continuously. And maybe this is a good time to remind the audience of ASA's vision. So, what is our vision? A world that relies on data and statistical thinking to drive discovery and inform decisions. In other words, statistics drives evidence-based decision making. So, we each live this vision on a daily basis, bringing our talents and our training and support of wisdom. I believe this vision will still be carried forward in 2035.

And as I look back, think about, you know, since entering this remarkable field, this really is at the intersection of science, engineering, and data. I've just personally witnessed so many advances over the last 35 or even just 15 years. So, if we think of like DNA sequencing has revolutionized genomics, enabling personalized medicine and transforming how we diagnose and treat disease. Breakthroughs in neuroscience underway right now are reshaping our understanding of the brain and cognition.

We're also confronting the realities of weather and resilience, prompting this urgent work to understand our role in environmental shifts and design strategies for sustainable development or adaptation. But at the same time, the rise of smart connected cities reflects a growing commitment to technologies that improve the human condition and foster more equitable, empowered communities.

Looking ahead, what do I hope to see? I guess I just hope to see a future where statistics and statisticians remain at the forefront of all of these amazing transformations, advancing a continually evolving discipline that is essential, again, going back to this discovery, decision making, and design.

We must continually engage collaboratively, helping science, technology, and society understand the world more deeply and navigate it more wisely. So that is my answer for

2035. So, you notice I didn't put a bullet on any one single thing, but just really tried to reflect our profession more broadly.

Ron Wasserstein: So, Lance, what do you have to say about this?

Lance Waller: Kathy did a great job. If I summarize what interests me most about the field of statistics is that we combine and evaluate the best data available to get the best answers to the questions at hand. Some of those questions are motivated by new ways to measure things. We have to keep up with the technology and hopefully influence the technology there. But some of these are questions that are different than we're used to seeing. That's been a lot of our experience with AI.

There's a lot of movement. But one thing I like about our field is we try to get the best answers we can, but we also have a healthy respect for uncertainty. We have, I would hope, some professional humility that we can make mistakes. We just want to minimize the type of mistakes we make and quantify that, understand it, try to do better than we did before.

There's a lot of room for optimization and I was trained in optimization myself, but if we wait for the best answer, sometimes we short circuit getting a good answer for a good outcome. So that's a lot lumped into a hand-waving and a pile of words, but I do think our field brings some reality to how do you implement database evidence-based decisions.

Ron Wasserstein: Thanks for those perspectives. Now I want to talk with you about artificial intelligence. I'm not going to ask you what it will look like in 10 years because if we put 10,000 experts together and asked them what it would look like in 10 years, I bet that in 10 years when we looked, every single one of those answers would be incorrect to a small or large degree.

But instead, I'd like to look at like now and ask you, and let's start with you this time, Lance, ask you what your perspective is on the opportunities and challenges for statistics with regard to AI.

Lance Waller: This is an ongoing discussion in our field and all of us are involved in these discussions. There's a lot of excellent working groups and conversations in our community. So our committee knows that we can't pull all of that together, but we want to get the general sense. And as you said, it's an area that's moving very, very fast. It's driven by some statistical ideas, also computing ideas. We're trying to capture some of the visionary thinking. It's not the only frontier to consider, but it's certainly changing the way we work.

I have a metaphor not everyone likes, but I'll share. If you think about the family tree of statistical developments, it's got its roots in probability and probabilities of making

mistakes. And we grew that tree to our branches through a bunch of assumptions. One of the assumptions being collect the best data you can, and the data was expensive.

So, you want to get the most out of the least amount of data you can. And we have a beautiful set of branches on how to do that. Design of experiments. These are really important issues. They're fundamental to our field, but some of those assumptions are a little different now. So, you can pull data together from different sources. It may not be exactly what you want, but there's a lot of it. And having a lot of it's not always better, but it might be better than ignoring it. Trying to regrow this tree with different assumptions may well end up with some different branches in addition to the branches we already have. So I think we need to think about that. The roots are strong and understanding uncertainty and variations of uncertainty is important. There'll be new versions of that, and I think it'll drive where we go. So, I think it's in collaboration. I don't think it'll only be in the statistics field. And I think there's a lot of AI developments that grew out of statistics, important components. I believe Kathy's got some comments on that.

Kathy Ensor: Sure, so let me jump in. Part of our information gathering, we held a panel of leading statisticians from industry. So that was one of our efforts and it was amazing. But also the message was clear that not only are we as research statisticians innovating and helping create this new AI world, we also need to become expert users of this world, integrating these tools in our day-to-day workflow. And from this leading group of industry statisticians, there was no middle ground. And so that was very clear.

And so, then I take that to my day-to-day work. I still try to be an active researcher and ask both practical and visionary questions. And I am actually super excited every day that I get to work on this type of research because of the AI tools. I can code more quickly, I can answer my questions more quickly.

Then my questions become richer and better. And I find it an absolutely fascinating time to be a statistician, wishing I was 20 again, but I'm not. It's not like all those 20-year-olds that are going to embrace our discipline. They'll be able to ask new questions or even ask the same questions but ask them in new ways.

Let me just get a very specific plug to a recent AAAS webinar, Chris Weichel that was held maybe a month or so ago. And Chris is one of the leading thought leaders in our field. And he was tackling the problem of understanding fire and the front edge of fire, forecasting the front edge of fire. And he was able to embed his hierarchical model within a machine learning framework that allowed him to do the computing faster and to really nail the answer to the critical question of how to forecast the front edge of a fire in real time.

And so it's that type of excitement that we're able to answer bigger questions or the same questions better. So, you know, not only are we advancing artificial intelligence as a community with our research, but just the use of it allows us to do more and do it better in some ways.

Donna LaLonde: Well, Kathy, I'm right there with you. Wishing that I was 20 again, sort of. There're some caveats there. So, I can't make us 20 again, but I can ask each of you to give some advice to those folks who are 20 or for those folks who are students or early career researchers now. And they want to position themselves to be at the frontier. What advice would you give to them to help make their future as productive as it can be? Kathy, I'll start with you.

Kathy Ensor: Let me go back to our information gathering exercise for this report. And we also held a panel of leading journal editors in our field. And so this is the fascinating part of doing this. We're getting to hear from so many great people about the field of statistics. But what we heard from these editors was the value of the type of research that statisticians do: the rigor and reproducibility, the importance of that and the importance of our journal process.

And everyone was forward-looking. Everyone was thinking about new ideas in our field. In fact, Lorin Crawford, one of our committee members, he's a part of the *JASA* reproducibility editorial team. And so, I want to tell the young people that that type of work is critically important for our field. But the strength of our science was also clear. They should just simply embrace our science.

We also heard from these editors the strong interest in interdisciplinary work and how excited they are to advance new things in that direction. And some new journals that are coming on. So like the ASA Discoveries as a new journal and ASA taking on the data science and science and starting the statistics and data science and imaging. There's other things going on in other professional societies along these lines that really bring more opportunities and more outlets for that strong interdisciplinary science where statisticians are either in a leadership role or a strong partnership role for advancing that science.

This is a long answer to the question. But the reason that I say this is because as you're a young person, you can embrace this rigor and reproducibility of our field. You can embrace methodological advances. You can embrace interdisciplinary science, whatever aspect of our very broad discipline that you value, and you are interested in, go for it. And we're problem solvers.

Our profession equips you to come forward with reliable solutions. And you'll always be a valued asset to any team. So, lean into that. Remain curious, inquisitive and continuously

learning. Embrace all these new technologies. Try to do it in a way that doesn't drive you crazy. But then also ultimately identify your unique contributions that you bring forward every day and be exceptional at the direction you choose, but sufficiently flexible to entertain new ideas. Be kind to each other. And most of all, have fun.

Lance Waller: I can speak with some experience because I've been 20 a couple of times. Kathy was saying this too. The young people in our field; they're the ones that define the frontiers. They are going to be doing the new things. So, your career, you're constantly going to be learning things. There are things you will take with you as sort of classic core ideas, but you'll be presented with opportunities and tools and technology that none of your advisors or teachers were. And that creativity being open on the door to my office, I have a sign that says, try often, fail sometimes and learn always. So don't be afraid to try new things.

I got some advice. I asked David Brillinger how he got to work on cool projects like an elephant seal diving data set. And he said, “I stopped to listen to what question they wanted to answer.” And so instead of shoehorning a study into something you already know how to do, listen to the people you're working with, find out what questions are motivating them, what data they have, and then try to see what questions you can answer with the data available, the methods you're familiar with, the good practices you're aware of, and then compare the answers you do get to the answers that motivated it and try to get those closer together.

What additional data would help? What adjustment to the method would help? What additional computing would help? I don't think any single project starts and finishes completely. It's always did you learn more going through this exercise than you knew at the beginning? And you'll learn more the next time around.

As Kathy was talking, I was also reminded during my time as department chair, I went to the Joint Statistical Meetings, and we had a chair meeting, and we were being presented by these young new assistant professors doing data science stuff. One of the chairs said, how are you going to get promoted doing that stuff? And I interrupted and said, it's our job to get them promoted. They're the ones doing new things. So as a result, I write a lot of promotion letters. So new things are going to happen. And I think for those of you who are entering the field, you're going to change the field. It's going to change with you.

For those of us in the field who are in leadership positions, we need to recognize that a lot of the change is coming after us and try to celebrate that. I think the dynamic nature of our field is really one of the exceptional components of statistics or a career in statistics. So you want to do work that you're proud of, but you also want to keep some humility in place that you didn't do everything on this and it's moving forward. And someone after you,

maybe you next year, will do a better job. That's what keeps a field fresh. That's what defines frontiers.

And that's what I think we're most excited about when we go to hear presentations on someone working in a new area. They usually didn't just start yesterday. They were just curious about it and started learning more about it. And before you know it, they're defining the frontiers. So, I'd encourage all your listeners to see where they can take the next things.

Donna LaLonde: Brittany, we'll turn it over to you. I suspect there are folks in the audience that would actually like to hear, how can I get a job like Brittany's? That sounds pretty cool. Lance and Kathy would like to know too. We all would. So, feel free to talk broadly, but maybe a little bit specifically as well.

Brittany Segundo: I'll start by saying for the sort of work we do on every single project I've been a part of at this point, which is a lot at this point. Every single project, I hear that we need an increasingly interdisciplinary workforce. And not in a way that this is nice to have, but in a way we are really concerned about the workforce and where it's headed. And we want to make sure that it is interdisciplinary.

And our CATS oversaw a study on digital twins that was published in 2024. And that was one of the prominent themes in that report is the need for an increasingly interdisciplinary workforce. That's something we heard on this study in an information gathering session where we heard from people from national labs. They said we need people who understand the statistics and the computational constraints we're up against.

Whatever you do, be willing to learn from other fields. Be willing to embed yourself in other fields. And I think I'm repeating what Lance was saying. Be listening to what their needs are. Every field, every domain has data questions. They have questions that can be answered well by statistical methodologies. So that's my first recommendation is to make yourself interdisciplinary. And echoing Kathy, be kind. That's the number one: be kind when you're working with people from other domains.

As far as my job, it is so much fun to be at the intersection of all these conversations. I think remember that there is a forest. It's not just trees. That's a big part of the job is there is a national discourse around these sorts of questions. Being able to abstract a level higher than just, you know, this paper or this one thread you're pulling. Look at the overall tapestry. And I believe that's too many metaphors in one answer, so 'll stop here.

Donna LaLonde: That's great. Thank you all.

Ron Wasserstein: Before we proceed, Lance, can we go back to that sign in your office again?

Lance Waller: It sounds like a haiku. But one day it just came to me about a year ago.

“Try often, fail sometimes, learn always.”

A lot of people in our field were good at school. We weren't used to trying things we could not succeed in. But sometimes you have to try something and have it not go well and learn something from that. So, I believe it came to me during a day where what I was trying was not working. And I thought, well, at least I know what doesn't work now. I look at it often just to remind myself that it's okay to try something you don't know is guaranteed to succeed.

Ron Wasserstein: Well, thanks. I feel like that's sort of the now you tell me thing because I realized that I had those verbs and adverbs not properly aligned. But now I know how they're supposed to go together. Let's get back to the study. And I want to ask each of you how you hope the study will influence research directions and funding priorities in statistics. Of course, I'm being optimistic when I use the word funding in there.

But what impact do you hope the study will have? Brittany, I'd like to start with you from your perspective in the academies and then Kathy and Lance in that order.

Brittany Segundo: In my role, it is my hope that the study demonstrates the significance of statistics to science and engineering, which is the title of the study. But statistics plays such a crucial role in enabling technology and in collaborations with other domains. And it serves a role for American competitiveness. And I hope this study continues to demonstrate the brilliant work that statisticians are doing and how vital that work is to our success.

Kathy Ensor: I’ll ditto Brittany. So absolutely, our profession is at the forefront of science and technology advances. And this report should provide that insight and lay a foundation for funding for the profession and why investment in statistics is so critical at this juncture. And I believe we're going to do that. And I'm optimistic. I know that these are very dynamic times for the whole science enterprise. But I do feel like our discipline and the thoughts that we're bringing forward in this report will really help advance society through the contributions that our discipline brings. And so, we're trying to lay out a funding foundation for the next few years, for sure.

Lance Waller: We have a resilient discipline that rises to challenges. When we started this study, we were thinking this was how far can we push things that are already on the edge. And I think one of the things we're finding is some of our frontiers might be filling in gaps, data we always assumed would be available or get bigger and bigger with more things added to it. Maybe it won't grow so fast. Can we use what we have in better ways? There are some real challenges there.

And I don't want to see frontiers only being considered to be pushing the existing things out there, but to try to make all of the work better. I believe a lot of us in our field, I know I get frustrated when someone thinks they took one statistics class, and they have the complete toolbox, and nothing's been added to it. I think it's a set of tools that you're constantly building new versions of. And we want those frontiers to answer long lasting questions better; answer new questions we've never thought of before. That's the exciting thing is that you can build this toolbox and you can define how do we use new types of data. How do we answer new questions? How do we combine things? These are old questions, but I think they kind of consistently define what's next for us.

Defining frontiers is always hard. It's really tempting to say, what have we been doing the last five years? That's really great. Or what's going on this week? But we don't know what our job's going to be like a year from now, but we have tools to make our job exciting and do new things. And I think we can rise to these challenges and further expand our field.

Ron Wasserstein: That's very much appreciated. We at ASA are so grateful that you all have undertaken this task and you can be sure that we are eager for this report, and we'll actively promote it when it arrives on our doorstep. So, we look forward to that.

Donna LaLond: This has been just such a wonderful conversation. I'm sorry that we're at the end. We have some traditional endings for *Practical Significance*. And one is that we love to hear what [in your spare time] you are reading, listening to, watching … help add to my TBR. So, Lance, I'll start with you.

Lance Waller: I'm really enjoying the *Thursday Murder Club* series of books. And then I just read a paper yesterday that had individual flight paths of individual mosquitoes. So maybe that's again, wow, that's amazing data. What kind of questions can you ask with that? Is that going to keep me from getting Dengue? I don't know, but I'll know how they were flying. So that's maybe an odd combination, but that's what's on my reading list.

Donna LaLonde: That's a great combination. Brittany, what about you?

Brittany Segundo: I love this question. My two favorite things on this earth are working with statisticians and talking about books. So, I lead a book club called the Big Books Book Club in my spare time where we read books that are over 500 pages, but we only read like four books a year, just to set expectations.

We're currently reading T*he Priory of the Orange Tree*, which is our first fantasy book by Samantha Shannon. It's very exciting and very different from our past books.

Donna LaLonde: And is this an in-person or virtual book club, Brittany?

Brittany Segundo: Virtual. We started during COVID. And as we've moved away to different places, we've kept going. And so, we've churned through all the classics. We've done Anna Karenina and things like that. So now we're branching out a bit more.

Donna LaLonde: I can already feel listeners reaching out wanting to know, can they join, right?

Brittany Segundo: We are always happy to welcome more members.

Donna LaLonde: Wonderful. That's great. And Kathy?

Kathy Ensor: I really am totally embedding myself in learning every AI tool that I can. It's almost becoming a journey on its own. I just find it very fascinating. So, I am spending a lot of time in that direction. Something I do while I'm anxiously waiting for the next season of *Lincoln Lawyer*. As Ron knows, I like to binge watch whatever's coming out. And then I started Nate Silver's *On the Edge*. I have to say that it's a little slow going for me, but I now have learned all the rules of poker and risking everything. So that's what's current in my space.

Donna LaLonde: That's great. Well, we really appreciate all those recommendations as we appreciate the time that you took to have a conversation with us today. And we have another tradition, and that is we always end with Ron's Top 10. So, I will turn it over to my colleague, Ron.

Ron Wasserstein: Thanks, Donna. Always eager to help our *Practical Significance* podcast listeners grow both professionally and personally, we take this opportunity to focus on a much-beloved institution, "Game Night." That special time when family and friends gather to eat, drink, play games, and hopefully remain on speaking terms by the end of the evening.

To help us avoid certain faux pas that we might be tempted to commit, here are the "Top 10 Ways Statisticians Ruin Game Nights."

And without further ado, here's a list of the behaviors that will guarantee you are never invited back:

#10: Insisting on randomizing seating arrangements between games to control for positional advantages.

#9: Delaying the start of a Clue game until they have calculated Bayesian priors for each suspect.

#8: Loudly calculating the player's expected value prior to their turn.

#7: During a game of Apples to Apples, developing a predictive model for each player's judging tendencies.

#6: Insisting that the game must be played 48 times to achieve statistical significance.

#5 Spending a half hour testing the dice for unbiasedness before starting a game.

#4: Turning Pictionary into a crowd-sourced annotation task.

#3 Demanding that the Scrabble tile letter values be reweighted based on modern text analyses.

#2 Lecturing on optimizing expected resource generation rates before beginning a game of Settlers of Catan.

And the # 1-way statisticians ruin game nights? Bragging about the machine learning algorithm they use to improve their social skills.

Well, that's it for this episode of *Practical Significance*. We look forward to continuing the conversation next month.

Thank you to Cytel for sponsoring the July episode of *Practical Significance*.