***Practical Significance* | Episode 58: Celebrating Grace Wahba—Scholar, Mentor, Pioneer—with Ming Yuan and Yoonkyung Lee**

Donna LaLonde: Welcome, everyone. We're so excited to be back with another episode of *Practical Significance*. Each episode is special, but today's is especially meaningful—we're celebrating Grace Wahba's winning of the International Prize in Statistics. We're joined by two people who know Grace well and will share their perspectives on her legacy.

Ming, let's start with you. Please introduce yourself and tell us about your day job.

Ming Yuan: Thank you, Donna. I feel privileged to be here to celebrate this special honor for Grace. I'm a professor of statistics at Columbia University. I was Grace's student—she was my PhD advisor—and I also had the privilege of being her colleague for a few years in Wisconsin. Her mentorship has profoundly influenced the way I think about statistics, machine learning, and research more broadly.

Donna LaLonde: Thank you, Ming. Yoon, please introduce yourself.

Yoonkyung Lee: Thank you for having me. It's a great honor to speak about Grace's legacy together with Ming. I'm a professor of statistics at The Ohio State University. My main research interests are broadly in statistical learning—something I learned from Grace. I've worked on classification, ranking, dimensionality reduction, and more recently, model sensitivity and complexity. I'm interested in how models produce predictions and what that tells us about their behavior.

Early Impressions of Grace Wahba

Donna LaLonde: Yoon, could you start by sharing your first impressions of Grace as a mentor and researcher?

Yoonkyung Lee: My impressions go back to when I was preparing to come to the U.S. for graduate study in 1997. Before arriving in Madison, I had already heard of Grace as a renowned scholar on the faculty. At my previous program in Korea, all the faculty were male, so I was especially excited to study in a department with such a distinguished female professor.

I also remember seeing the term "machine learning" in her research description on the department website. This was the 1990s—few statisticians even knew about the field at the time. I didn't either, but I was intrigued. Grace was a true pioneer, recognizing early on the potential of combining statistical thinking with computing to solve real problems. I was

naturally drawn to her research and decided to take her class on smoothing splines. The framework was mathematically elegant, flexible, and powerful. Working with her as my advisor was an easy decision, and I was so glad she agreed.

Donna LaLonde: Wonderful. Ming, what are some of your early memories?

Ming Yuan: I first met Grace within a week or two of starting graduate school in Wisconsin in 2000. Honestly, I hadn't known much about her work beforehand. By chance, my office mate—another of her students—told me Grace would be a wonderful advisor. I emailed her, sent some of my earlier work, and she graciously agreed to meet.

I still vividly remember stepping into her office—papers and books everywhere! I had been working on kernel density estimation, and the first thing she pointed out was, "The kernel you're using is very different from the kernel I use." She pulled a classic paper off the floor on reproducing kernel Hilbert spaces and told me to take a look. That moment shaped the direction of my research.

Wisdom and Advice

Ron Wasserstein: Ming, did Grace share any wisdom or advice that has stayed with you?

Ming Yuan: Too many to count. One that stands out is what I call her "Nike slogan"—"Just do it." When I hesitated to take on a difficult research problem, she told me: "Just because a problem is hard doesn't mean you can't make progress. Everyone thinks it's hard, so few people even try. If you start, even a small step can be significant." That advice has stayed with me.

Another piece of wisdom was about collaboration. Grace reminded me to set clear expectations with collaborators. Many people see statisticians as magicians who can wave a wand over data to answer million-dollar questions. To avoid that trap, she taught me to establish realistic goals and boundaries—advice that's been invaluable throughout my career.

Ron Wasserstein: Yoon, how about you?

Yoonkyung Lee: What stayed with me was the joy of working with Grace. She celebrated every achievement, big or small, and encouraged us to explore new ideas. That joy is something I now try to pass on to my own students.

In terms of advice, I remember reading something she said upon her retirement: "If you want to do well, pick something you really love and put your nose to the grindstone. It takes a lot of hard work, time, and some luck." That's advice I carry with me every day.

Grace's Legacy and Impact

Donna LaLonde: Yoon, what do you think Grace would say about the current state of statistics and machine learning?

Yoonkyung Lee: I think she'd be delighted. Her representer theorem has become foundational in machine learning, making it possible to solve problems in infinite-dimensional spaces. Over the years, the line between statistics and computer science has blurred. Grace always encouraged collaboration between the fields instead of drawing boundaries. That perspective feels even more relevant today.

Ron Wasserstein: How do you see her intellectual legacy continuing, Yoon?

Yoonkyung Lee: She's regarded as the "mother of smoothing splines" and a guardian of kernel methods. Her contributions are everywhere—from standard regression modeling taught in classrooms to new applications in machine learning. Her kernel-based framework still shapes current research, including in neural networks.

Ming Yuan: I agree. I'll add one anecdote: I once met a leading climate scientist who told me he had been using Grace's smoothing splines throughout his career. That amazed me—her work reached far beyond statistics, into climate science, medicine, and beyond. In many ways, she was doing data science before it even had that name.

Looking Forward

Donna LaLonde: Ming, if Grace were starting her career today, what do you think she would work on?

Ming Yuan: I think she'd continue to pursue applied, interdisciplinary problems—whether in climate, medicine, or neuroscience. She wouldn't chase trends or work on problems purely for abstraction. Instead, she'd combine her curiosity with modern computing power—perhaps even foundation models and large-scale AI methods—to solve meaningful, real-world problems.

Closing

Donna LaLonde: Thank you both for sharing these reflections. You've painted a vivid picture of Grace's impact as a scholar and mentor.

As is tradition on *Practical Significance*, we end with Ron's Top 10 list.

Ron Wasserstein: Thank you, Donna. In honor of the season, here are the "Top 10 Costumes to Wear to the Statistics Department Halloween Party"...

Another lesson came later when I returned to Wisconsin as a faculty colleague. Grace often reminded me: when starting collaborations, set the right expectations for yourself and for collaborators. People unfamiliar with statistics often think statisticians are magicians who can wave data into answers. To avoid frustration, clarify expectations from the start. That advice has been invaluable for long-term collaborations.

Ron Wasserstein: Yoon, how about you?

Yoonkyung Lee: What stayed with me is less about specific advice and more about the joyful experience of working with Grace. She was always encouraging, open to different ideas, and made me feel my work was meaningful. She celebrated every achievement, big or small.

Through Grace, I learned the joy of creating new ideas and doing research. I hope my students experience that same joy when working with me.

That said, there is one piece of advice I remember. At the time of her retirement in 2018, in a Wisconsin newsletter, she said: "If you want to do well, pick something you really love and put your nose to the grindstone. It takes a lot of hard work, time, and a certain amount of luck." That advice still rings true.

Research Methods and Influence

Donna LaLonde: Let's shift from advice to how Grace influenced the way you work. Ming, are there aspects of her research methods or problem-solving approaches that you now find yourself using?

Ming Yuan: Yes, quite a few. Two things stand out. First, Grace was a trailblazer. She had the courage to explore new areas—not always trendy ones, but problems she loved.

Second, her persistence. She worked on splines at times when the field didn't fully appreciate the value. Even when it seemed impossible, she persevered. She often told me stories about challenges she faced. The key to overcoming them was her passion and interest in the problems.

So, two lessons I carry with me: take risks on problems you care about, even if you don't know the outcome; and persist, even when it's hard.

Donna LaLonde: Thank you, Ming. Yoon, how about you?

Yoonkyung Lee: I see Grace's influence all through my work. I use her reproducing kernel framework in many of my papers and in my students' dissertations.

For example, I studied the geometry of kernel PCA, estimated covariance functions for longitudinal data using her smoothing-spline ANOVA technique, and examined the asymptotic properties of support vector machines using her insights. More recently, in my own work on model sensitivity and complexity, I've revisited the concepts of hat matrices and degrees of freedom—ideas that go back to what I first learned from her.

It amazes me how ideas I first encountered through her are still resonating with me today, taking new forms and leading to new insights.

Ron Wasserstein: I can't resist pointing out that you're reproducing the things she taught you. Donna, back to you.

Grace's Perspective on Statistics and Machine Learning

Donna LaLonde: Yoon, let me ask you to read Grace's mind a bit. What do you think she would say about the current state of statistics and machine learning?

Yoonkyung Lee: I'm sure Grace would be delighted. Her representer theorem is foundational and has been used to create many new machine learning procedures. It allows us to solve problems in infinite-dimensional spaces.

Over the years, the boundary between statistics and computer science has blurred. Many statisticians now participate in machine learning conferences or hold joint appointments in computer science. Data science has become a thriving field.

At first, when machine learning took off, statisticians felt the need to define what was unique to our discipline. But I remember Grace advocating that instead of drawing boundaries, we should learn from each other and work together to solve real-world problems using data.

Intellectual Legacy

Ron Wasserstein: How do you see Grace's intellectual legacy influencing new generations? Yoon, let's start with you.

Yoonkyung Lee: Grace is regarded as the mother of smoothing splines in statistics and a guardian of kernel methods in machine learning.

Her smoothing spline technique is an elegant extension of linear regression, widely used and taught everywhere. The fact that it's available in every statistician's toolbox is proof of her lasting impact.

She also laid the foundation for kernel methods, an abstract formulation of smoothing splines using Hilbert space geometry. I find it fascinating to see how her perspective influences today's research on neural networks. For example, researchers have used the concept of the neural tangent kernel to understand the training dynamics of wide neural networks. Her framework remains deeply relevant.

Ming Yuan: I agree completely. Let me add an anecdote. I once met a leading climate scientist, a founding director of a water sustainability institute. When I mentioned Grace was my advisor, he became excited. He told me he had been using smoothing splines throughout his career for all kinds of data problems. He regularly returned to Grace's website for tools and techniques.

That amazed me—her work reached far beyond statistics, into climate science, neuroscience, medicine, and more. In many ways, Grace was doing data science before it even had that name. She combined domain problems, computing, and statistics long before "data science" was coined.

Looking Forward

Donna LaLonde: Ming, if Grace were starting her career today, what areas might capture her interest?

Ming Yuan: That's tough to answer, but I know she would continue to be interdisciplinary and applied. Throughout her career, she contributed to climate science, neuroscience, and medical research, while also advancing computation.

Today, I imagine she'd embrace large-scale computing—maybe even foundation models—and apply them to important scientific problems. What she wouldn't do is sit in an office working on abstract problems with no application or simply follow trends. She would choose problems that mattered and approach them in innovative ways.

Reading, Listening, and Watching

Donna LaLonde: We have a tradition on *Practical Significance*: we ask our guests what they're reading, listening to, or watching. Ming, let's start with you.

Ming Yuan: I don't watch much TV, but I like reading. I just started *Genius Makers*, a book about the evolution of modern AI and deep learning. It tells the story through the people, corporate competition, and national interests involved, not just the technical side. Some of the characters are people I know personally. The book is well-written and humanizes the story behind AI. I've read about a third so far and am really enjoying it.

Donna LaLonde: Wonderful. I'll add that to my list. Yoon, how about you?

Yoonkyung Lee: On road trips, my husband and I listen to music and podcasts. On a recent trip, we listened to Hasan Minhaj's podcast *Hasan Minhaj Doesn't Know*. In one episode, he interviewed astrophysicist Neil deGrasse Tyson on AI and why it is overrated. I found it particularly interesting and recommend it.

Donna LaLonde: Thank you both for sharing your memories of Grace and for joining us on this special episode.

Ron's Top 10

Ron Wasserstein: As listeners know, we also have another tradition: my Top 10 list. This time, it's the "Top 10 Costumes to Wear to the Statistics Department Halloween Party."

#10 Go as a large language model. Wear a costume covered in random words and phrases and jump into conversations by predicting what people will say next.

#9 Null hypothesis. Wear regular clothes but carry a sign that says H_0. Keep insisting there is no difference between you and someone in costume.

#8 Multicollinearity: three identically dressed people who keep finishing each other's sentences.

#7 An AI hallucination: carry around nonsensical objects—like a tennis racket without strings—but assert confidently that they're normal.

#6 A random walk: wear a magician's outfit with a top hat and cane, and stroll through the party, changing directions frequently.

#5 Error types: arrive as a couple—one with α, one with β. Or dress as Neyman and Pearson.

#4 Bayes' theorem: wear any costume you like, but update it frequently based on what others are wearing.

#3 Regression to the mean: start the party in a loud, flashy costume, then gradually change into ordinary clothes as the night goes on.

#2 A neural network: connect yourself to other guests with yarn and tape, asking each about their activation function.

#1 A counterfactual: don't wear a costume but spend the night thinking about what would have happened if you had.