Every life has its crucial decision points — those moments when a choice one way will result in one life story, and a choice the other way will result in a radically different story. Lee-Ann Jaykus faced one of those decisions in high school.

"Initially, what I liked most was music," Jaykus recalls. "I played the flute. But then I took my first biology class, and I realized that I liked studying science more than I liked practicing the flute," she says with a laugh. "So here I am. That was probably a really good choice."

It probably was. Jaykus is now a food virologist and one of the nation’s leading experts on food safety, and she’s a William Neal Reynolds Distinguished Professor in NC State’s Department of Food, Bioprocessing and Nutrition Sciences. She’s also directing the U.S. Department of Agriculture’s Food Virology Collaborative (called NoroCORE), a five-year, $25 million project to reduce the burden of foodborne disease associated with viruses.

When Jaykus entered college, she continued to follow what interested her most and made her happiest.

"In my first microbiology class, in sophomore year, we worked with culture plates," Jaykus says. "Things on the plates turned colors, and I really liked that — although microbiology has certainly changed a lot over the last 30 years!"

Jaykus knew she liked microbiology, but it’s a vast field, and she was mindful of her mother’s advice: "It’s better to be a big fish in a little pond than a little fish in a big pond.” Jaykus eventually chose the little pond of food microbiology, where she earned both her bachelor’s and master’s degrees.

Before going into academia, Jaykus worked in industry, first as a quality assurance manager and then running a microbiology lab for a testing firm.

In the late 1980s and early 1990s, food safety began to emerge as a discipline in its own right. Jaykus understood that she wanted to push her career in that direction, which would require her to get a Ph.D. She was willing to go back to school and earn the degree, "but I didn’t want to get a Ph.D. in food science, because I’d already done that," she explains.

To chart the next stage of her journey, Jaykus went to food-safety conferences, attended the lectures, and talked with participants to determine where the discipline was headed. That’s how she identified four main emergent areas of activity in food safety: epidemiology, risk assessment, molecular biology and food virology.

Jaykus looked for doctoral programs that would allow her to work in all four areas. The only one she found was in the School of Public Health at UNC-Chapel Hill, so that’s where she earned her doctorate.

When her degree was almost complete, one of her dissertation committee members — a food microbiologist from NC State — mentioned that NC State had a position open in Jaykus’ field.

"I said, ‘That’s great, but I’m very nontraditional. I’ve had a very different trajectory,’” Jaykus recalls. “My committee member said, ‘Well, I still think people would like what you’re doing.’ So I applied for the position. The rest is history.”

Jaykus joined NC State’s faculty in 1994. She soon found that she was very well positioned in her field because of her unique educational and professional preparation covering the four emerging domains of food-safety research. She immediately began developing a research program based on those areas.

"When I started at NC State, nobody knew or cared about viruses in food. There was a lot of work addressing viruses in water, but not in food. ...There were very few scientists with the unique combination of expertise in both viruses and foods. I was one of maybe two or three people in the whole country who fit that description. So my life got very crazy very quickly."

— Lee-Ann Jaykus
• LEFT: Researchers designed and built a “vomiting machine” that provided the first laboratory evidence that vomiting causes norovirus to be aerosolized at levels high enough to transmit the virus to another person. • FAR LEFT: Food virologist Lee-Ann Jaykus leads NoroCORE, a five-year, $25 million project to reduce the burden of foodborne disease associated with viruses.

and food-safety experts,” Jaykus says. “There were very few scientists with the unique combination of expertise in both viruses and foods. I was one of maybe two or three people in the whole country who fit that description. So my life got very crazy very quickly.”

Soon the federal government started asking Jaykus to serve on national food-safety panels to advise policymakers. Then she was elected to the executive board of the International Association for Food Protection, the world’s leading food-safety association. Jaykus served as president of the organization in 2010-2011.

Around the same time, the U.S. Department of Agriculture issued a call for proposals to establish a national food virology initiative. Jaykus took the lead in developing a proposal and assembling a team to work on the initiative. The USDA funded her proposal, and that’s how NoroCORE (Norovirus Collaborative for Outreach, Research and Education) came into being.

NoroCORE focuses on combating noroviruses, which cause the illness variously known as “stomach flu,” “24-hour bug” or “cruise-ship virus.” The primary symptom of norovirus infection is vomiting, often accompanied by diarrhea and abdominal cramps — a miserable way to spend the 12 to 72 hours of a normal course of infection in a healthy adult.

But if you’re a member of a high-risk group, such as the elderly, the disease can last far longer and become much more severe — occasionally even fatal. It’s now believed that noroviruses cause perhaps 50 percent of all foodborne illness, and they’re easily transmitted between people via fecal matter and vomit. That’s why it’s estimated that around 20 million norovirus cases occur each year in the U.S.

NoroCORE is trying to change that. The NC State-led initiative brings together more than 30 lead scientists and their teams from 22 partner organizations.

“We’re taking a wide, multidisciplinary approach,” says Jaykus, NoroCORE’s scientific director. The team is working on several focus areas at once, including sanitation and hygiene, education and outreach, epidemiology and virus detection. “NoroCORE is a great example of team science, which is my favorite way of approaching science,” she says.

Among NoroCORE’s recent breakthroughs is the discovery that vomiting can cause norovirus to be aerosolized at levels high enough to transmit the virus to another person. Epidemiological evidence has long suggested such a mechanism for norovirus transmission, but no one had verified it in a laboratory until Jaykus and her team designed and built a “vomiting machine” that allowed them to test that thesis under controlled conditions.

Jaykus talks optimistically about putting even more irons in the fire in the future: working more with the federal government and with industry, and getting back into the classroom to teach. Yet she still decides what to do based on what matters most to her — and that includes her family.

“I didn’t accomplish any of this without considering my family all along the way,” Jaykus says. “All my career choices took them into account. For instance, I purposely didn’t travel much for work until my daughters were in college.”

When asked how those decisions affected her career, Jaykus gives an unequivocal reply: “Not at all. Saying no to an opportunity now doesn’t mean another opportunity won’t come along later. If you work hard and earn a good reputation, there will always be opportunities for you.”

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