GI SUCCESS

Meet Linda Samuelson: physiologist, teacher, opera fan, cyclist and 93rd president of APS.

BY MELANIE PADGETT POWERS

In April 2020, Linda C. Samuelson, PhD, FAPS, FAAAS, became the 93rd president of the American Physiological Society. Samuelson is the John A. Williams Collegiate Professor of Gastrointestinal Physiology at the University of Michigan in Ann Arbor. She's also a professor of molecular and integrative physiology, a professor of internal medicine in the Division of Gastroenterology and director of the Center for Cell Plasticity and Organ Design at the university.

The Physiologist Magazine interviewed Samuelson about her science, how the pandemic is affecting her work and what she does for stress relief.

Photo, facing page, by Chuck Fazio

"APS has been a great home. I've always been the kind of person who volunteers their time to make any community that I'm involved with better."

Clockwise from top, Sameulson hiking with her husband, Joel, and their oldest son, Jon Howell, and his wife, Rhianna. Samuelson and her husband and younger son, Ben, biking on Martha's Vineyard. Biking with her husband in Croatia.

How did you become interested in science?

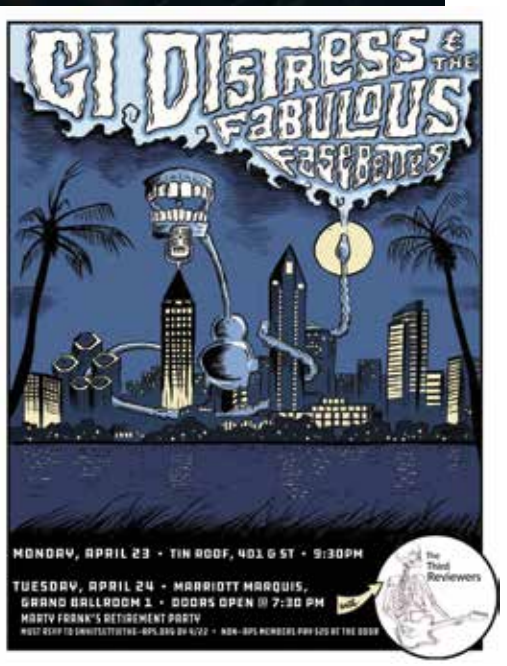
Even as a young kid I was always interested in science. I was drawn to nature and biological sciences, but I really liked all math and science. In high school, I was chosen to help the chemistry instructor set up labs. So, I think my teachers recognized that I had an interest in science from a pretty young age. Then in college I majored in biochemistry. I knew that I wanted to go to graduate school and continue my science post-college. I never was very interested in medical school. A lot of my friends from college were doing that, but I really wanted to get into the details of how things worked and learn more about how the pieces fit together to support life.

Why did you choose physiology as a career?

To be honest, I think physiology chose me. I originally studied molecular genetics, but I was unsatisfied with the lack of appreciation of the functional implications of the genes and the gene families that I was studying. And I was drawn to understanding fundamental processes and how they inform our understanding of organismal function, as well as how they inform our understanding of mechanisms of human disease. So when I set up my own individual research program as an assistant professor of physiology, I turned to research that relied on the newly emerging gene targeting technology to create mouse mutants so that I could study the function of genes or gene families in living animals to try to understand physiologic function.

What area of physiology are you working in today?

I was particularly drawn to the gastrointestinal (GI) tract and how



Samuelson and the band GI Distress at the closing party at EB 2018, along with one of their event posters.

that was regulated. My work has evolved over time, but for some time I've been doing research in the field of stem cell biology. I'm fascinated by stem cells and how they renew adult tissues in health and contribute to disease. In particular, my work focuses on GI stem cells. These cells maintain the lining of the GI tract by continuously generating new cells. It's an astounding process. It's been estimated that there are 10 billion new cells made every single day in the human intestine, which is mind boggling, right?

My interest is in trying to understand the fundamental mechanisms of how a stem cell knows what it is and what it should be doing and how those mechanisms might be dysregulated to lead to proliferative diseases like cancer.

How has the coronavirus pandemic affected you and your work?
At the University of Michigan and in the state of Michigan we currently have a stay-at-home order [in mid-May]. We're only allowed essential activities in the laboratory. We can't start new experiments unless it's somehow related to COVID-19. So most everyone in my research group is working from home. I had to teach my class by video lecture, which was an interesting experience. I teach a section on GI physiology.

As for my lab, I have one lab member coming in two to three times a week to take care of our mouse colony. She manages the breeding colony and the genotyping of the new mice that we're generating. We shrunk the colony way down at the beginning, and we're now building up animals to do experiments, hoping that we'll be able to get back in the lab in June.

The other thing that's happening is that we're shifting to things we can do from home—analyzing previously generated data, writing manuscripts and fellowship applications, planning new experiments so that we'll be ready when we can get back. Our research meetings are remote video meetings.

It's not that things aren't happening; it's just that it's very different than it was. In many ways, I feel lucky because I have a well-equipped home office with good internet so I can work at home pretty effectively.

What advice do you have for graduate students during the pandemic?
Stay engaged as much as possible and identify things that are going to move your work forward. Some of the people in my group are taking online classes to gain skills, to broaden their knowledge. For example, I have one person who's taking an online class on big data analysis because she's going to be doing an RNA sequencing experiment when she's back in the lab. A PhD student in the lab is taking a programming class to learn how to write code in a specific computer language.

The other part that I think most people are doing is to take on a writing project. It's really a fantastic time to read the literature and understand the foundational work and recent discoveries and maybe translate that understanding into a review article. And I know the *American Journal of Physiology* journals are interested in getting review articles from trainees at this time. I think reading, writing and investing in continued learning are things that students can do, even though they're not in the lab right now.

My more general advice for graduate students is to follow your passion. Doing science requires discipline and hard work, and unless you have passion for what you're doing to keep you engaged, to make it fun when the science gets challenging, it's hard to sustain.

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Tell us how you got involved with APS and what it has meant to you.
I joined the Society around 1995 when I was an assistant professor. I had just joined this Department of Physiology, and I joined APS largely because my department chair advised me to. His name is John Williams, and he was very active in APS and is a past president. John was a huge mentor for me, and I'm currently the John Williams Collegiate Professor of Gastrointestinal Physiology, which reflects his important role for me in advancing my career.

Samuelson becomes APS president—complete with a gavel APS staff mailed her—during the virtual Annual Membership Meeting in April.

APS has been a great home. I've always been the kind of person who volunteers their time to make any community that I'm involved with better. So I got involved with the Gastrointestinal & Liver Section, served on a variety of section committees and then started to get involved in the Society-wide committees.

Who have been other important role models in your career?
Miriam Meisler, who was my postdoctoral mentor. I think about her passion and commitment, but also her approach to the people she works with—to value them and value their life outside the lab. For example, I remember her love for new babies, and when I had my children, I felt like she was as excited about me having children as she was if I made some kind of scientific discovery. She taught me that as a scientist, you integrate this life passion you have for your research with a fulfilling personal life.

How have you maximized collaboration in moving your research forward?
I really enjoy and value my colleagues, and so I'm always looking for ways to interact. When I started as an assistant professor, there were two other faculty members that started around the same time, Juanita Merchant and Deb Gumucio. We were in three different

departments. I was in physiology, Deb was in cell and developmental biology, and Juanita was in the Department of Medicine. We were all GI scientists interested in different aspects of GI science, and we started having group meetings together because we thought that through our interactions we would amplify our own ability to do research. So, over the years, we had many collaborations, shared projects, shared grants. For quite a number of years, we had a big, open, shared laboratory space.

As APS president, how do you want to advance and expand the APS community?

This is going to be a tough time, right? We don't even fully know what the impact of the pandemic is going to be. However, we are already planning for major financial challenges with the transition to open access publishing, which really changes the funding model for the Society.

The biggest thing I am thinking about is how to make an impact with the planning of our annual meeting. The new APS Annual Meeting will launch in 2023, when we're going to pull out of Experimental Biology (EB). I feel like we have a unique opportunity as a Society to program high-level, cross-sectional talks that bring in the top physiological science to our meeting, and I really want to work to make that happen.

When life gets hectic, how do you step away and have a little fun?

My husband, Joel, and I have two passions: opera and bicycle riding. We love classical music; the music school here at the University of Michigan is terrific, so we are very involved there. We also travel to see performances, and we have season tickets for Lyric Opera in Chicago. Then, the other part, which is fun but different, is bike riding. Biking's been a consistent part of our lives for a long time. It's a great way to get out, escape the pressures and problems, clear your head and reset. In order to bike, you have to stay present; you have to pay attention to what you're doing. So you quickly get out of your head, and you're experiencing the outside and enjoying the ride. In addition to riding around Ann Arbor, we take bike-touring vacations. I think we've had more than 15 at this point, going to Italy, France, Spain, England and many others.

You're in a band called GI Distress that has been known to sing on stage at the APS annual meeting at Experimental Biology. Tell us about that.

First, I have to say science and rock and roll—what could be better, right? It's been fantastic. We are mostly a cover band performing rock music. I'm part of the backup singers—we're called the FASEBettes. There's a lot of talent in the broader GI community, and the band is from all over the world. Our lead singer's in Dublin, Ireland; our keyboard player is in Los Angeles; our lead guitarist is in Virginia; our drummer is in the Boston area; the bass player is in Georgia. The only time we get together is at scientific conferences. We used to say that we performed more than we practiced!

FASTFACTS

Legacy of APS Service & Physiology Leadership

- APS member since 1995
- Fellow of APS since 2015
- Fellow of the American Association for the Advancement of Science since 2019
- APS Takeda Distinguished Research Award
- Horace W. Davenport Distinguished Lectureship
- American Gastroenterological Association's Grossman and Funderburg awards
- Excellence in Mentorship Award, Program in Biomedical Sciences, University of Michigan
- Lyman Briggs College Distinguished Alumni Award, Michigan State University
- *American Journal of Physiology-Gastrointestinal and Liver Physiology* editorial board, current member
- APS*select*, APS' monthly collection of the "best of the best" research articles, editor-in-chief
- APS Council, former member
- Gastrointestinal & Liver Section Steering Committee, former member
- Committee on Committees, past chair
- Publications Committee, former member
- Finance Committee, former member
- *Physiological Genomics*, past associate editor

Education

- PhD, Microbiology, University of Chicago
- BS, Biochemistry, Michigan State University

Bucket List

- "Seeing more parts of the world, while sharing my science."
- "Exploring more places by bike. Our next trip was going to be to the Basque region of France and Spain this fall."
- "I'm expecting my first grandchild in July! I expect that my bucket list will be changed by this major life event."