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**Exploring the anomalous cytotoxicity of commercially-available poly(N-isopropyl acrylamide) substrates**
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**PERSONAL MOTIVATION:** Experience as a breast cancer patient led to adaptive designs for current medical devices to help patients live better, more independent lives
**ADVOCATE**: Diversity yields better and more creative results … there is a place for YOU in science and engineering.
**Heather Canavan** is an associate professor at the University of New Mexico in the Department of Chemical and Biological Engineering. After receiving her Bachelor's in Biology from the University of California at Santa Barbara, Canavan worked at the Los Alamos National Laboratory for several years. She then received her Ph.D. in Physical Chemistry from the George Washington University for her work with the late Prof. David Ramaker. Her research was the first to apply X-ray absorption near edge spectroscopy (XANES) in the sulfur K-edge region to observe the structure of proteins under oxidative stress. Her dissertation research was performed at laboratories at the Brookhaven National Laboratory, Naval Research Laboratory, National Institutes of Standards & Technology, and the Food & Drug Administration. After receiving her Ph.D. in Physical Chemistry (with a graduate minor in Forensics), Canavan worked as a postdoctoral fellow at the University of Washington in the National ESCA Surface Analysis Center for Biological Problems (NESAC/BIO) under Dr. David Castner. In a collaborative project with Xuanhong Cheng in the laboratory of Dr. Buddy Ratner, Canavan began using advanced biological and surface analysis methods to understand how poly(*N*-isopropyl acrylamide) (pNIPAM) is able to detach confluent mammalian cell sheets in response to environmental cues. Canavan joined the University of New Mexico in 2005. Since that time, Canavan has continued to study the applications and uses of pNIPAM for biomedical purposes, such as in engineered tissues and sensors. In a previous publication in this journal, Canavan and Cooperstein explained the mechanism by which cells detach from pNIPAM. In another, they showed that although the NIPAM monomer is cytotoxic toward cells, almost all formulations of the polymerized form are biocompatible, noting that commercially available pNIPAM (used as-is, without further purification) does cause some cytotoxic effects. In this publication, the authors further explore and explain these effects on mammalian cells. In addition to her research, Canavan is active in both the chemical engineering and biomedical engineering programs at University of New Mexico and teaches courses in Biomaterials, Engineering Design for Global

Health, and Adaptive Design for the Community. Canavan was elected as an AVS Fellow in 2018 for her research contributions, as well as her contributions to engineering education.

My educational training includes degrees in biology, physical chemistry, and forensics. This interdisciplinary background is what led to my research focus on cell/surface interactions, especially bioactive and stimulus-responsive polymers. As a professor, I have taught courses in thermodynamics, biomaterials, and engineering for global health. More recently, my experience as a breast cancer patient led to my interest in creating adaptive designs for the community to help patients create the devices that will help them live better, more independent lives. Together with a female graduate student, I have started a company that is focused on bringing these adaptive designs to the community at an affordable price.

In the 15 years that I have been studying the cytotoxicity of bioactive polymers such as pNIPAM, I have been fortunate enough to work with over 50 students and postdocs, 63% are women, and 73% are under-represented minorities. The students who co-authored this paper with me come from different parts of the world such as Poland, Vietnam, and the United States; their educational background spans the Schools of Engineering, Business, Biology, and Psychology; and their ultimate career goals are to work in academia, in industry, and in medicine. I find inspiration that an interest in science and engineering can create connections that not only span a diversity of backgrounds, experiences, and interests, but also recognize that this diversity yields better and more creative results. So, for the young authors out there are asking whether you can find a place in science and engineering, and in this type of research, “sí, se puedes” and “yes, we can.”