Protect our scientific future

(As published in The Oak Ridger's Historically Speaking column the week of June 9, 2025)

This Historically Speaking column comes from Benita Albert, who provided Katherine Xue the opportunity to request action. Katherine is an Oak Ridge graduate who is currently working on microbe research that she feels is meaningful and has great potential for the future. However, she feels the support for science, such as that in which she is engaged, is in danger.

Please consider what she has to say.

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When I think about why I became the scientist I am today, I think back to the summer before my senior year at ORHS, when I first learned how microbes transform our world.

I was taking Math Thesis, working with scientists at UTK and ORNL to find microbes that could break down leftover crops into ethanol to fuel our cars. Before then, the only microbes I had known about were the ones that made us sick, and I was dazzled to learn about the trillions of helpful microbes that live in the environment and in our bodies.

From that summer, I took away two lessons that have guided me ever since: that harnessing our microbial partners could help us build a happier, healthier world, and that harnessing my scientific curiosity could help us get there.

Fast forward more than a decade, and I am still entranced by the power of microbes. From Oak Ridge, my scientific journey has taken me to all corners of the country and, most recently, to the University of California, Irvine, where I started as an Assistant Professor this spring. My new research lab is studying how to help our gut microbiomes recover after disruptions like antibiotics, which can harm the friendly microbes that help us digest our food and keep us from getting sick.

For now, the lab is still a quiet, empty space, waiting to be filled with complex equipment and energetic young minds. But in the coming years, my goal is to help design more effective probiotics to help the millions of Americans who suffer from microbiome-related gut diseases. I am far from alone in my scientific dreams: many of my fellow ORHS alums have gone on to careers in science and engineering.

But just as my career as an independent scientist is beginning, America's scientific future is under threat. In the past several months, billions of dollars in federal science funding have been abruptly withdrawn. These cuts may soon get worse: Congress is debating a proposal that would eliminate approximately half of the budget of the National Science Foundation and the National Institutes of Health (NIH).

These cuts would be devastating for America's standing as a scientific superpower. Since World War II, our economy has been powered by a simple, brilliant model: the government invests in fundamental research, and private industry builds on these discoveries to bring new products and medical treatments to market. The NSF and NIH have historically had strong, bipartisan support because this investment more than pays for itself. Federally funded research was behind each of the 210 new drugs approved from 2010 to 2016, and each dollar invested in the NIH produces approximately $2.50 in economic growth.

The brilliance of this model is that it harnesses the innovative spirit of researchers across the country, and the world. Publicly funded research is publicly available, unlike most research done by private companies, who need to profit from their discoveries. This means that thousands of researchers can tackle questions that are too big and expensive for even the biggest company to take on alone—and everyone wins.

Take my lab as an example. I am developing better ways to measure which microbes in our guts compete and cooperate with each other, which will make it easier to design better probiotics. I have only a small team, and I can't test treatments in mice or run clinical trials myself. But because my research has been funded by the NIH, any lab or biotech startup across the country can use my methods and data for purposes I can't begin to imagine.

The result is that science moves faster, through many avenues, towards the breakthroughs and treatments that patients desperately need. And the history of science is full of unexpected discoveries. For instance, as much as I love microbes, I would never have imagined that they could help treat human

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genetic disease. But last month, more than thirty years after researchers discovered CRISPR systems that help bacteria defend against viruses, scientists successfully used CRISPR to cure a baby born with a life-threatening genetic condition, paving the way for more gene therapies.

Cutting back funding for fundamental science means cutting back on these future discoveries. In the years to come, there will be fewer new cancer therapies or Alzheimer's treatments to help those we love.

It is hard to imagine losing things that have not yet come to pass, but we are already seeing the impacts of these cuts on young scientists. My friends and peers are rushing to finish experiments because they are afraid that their funding will disappear. Most young American scientists I know are looking for jobs abroad, faced with a choice between leaving science and leaving home.

I urge Oak Ridgers to speak out against these cuts to science. Our town's history embodies the spirit that has made America the greatest scientific power in history. We show how investment in science can create a thriving, one-of-a-kind community. Call our Congressional representatives today and tell them you support science funding. Our community's scientific heritage—and our country's scientific future—depend on you.

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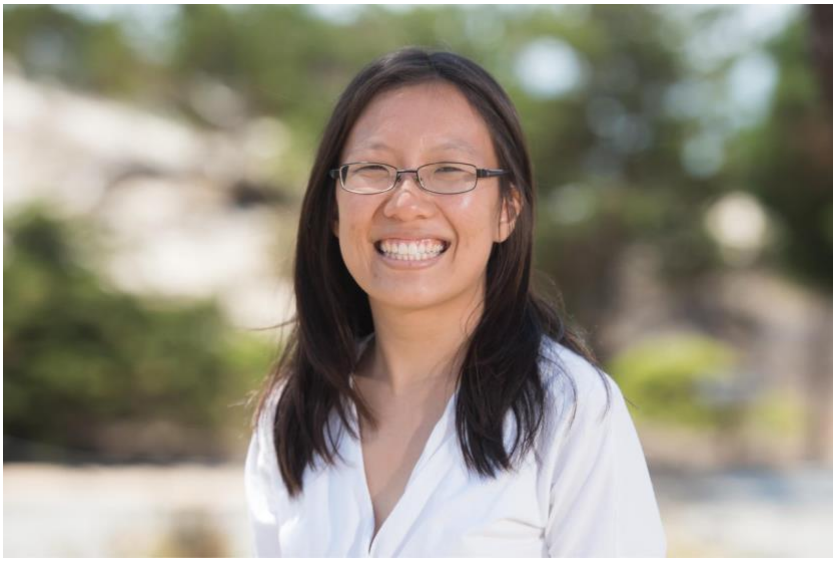
Thank you, Benita Albert and Katherine Xue, for taking the time and effort to enlighten Historically Speaking readers of the danger being faced by young scientific researchers whose funding is perceived as being in danger of being reduced or eliminated.

If you would like to know more about Katherine Xue, Benita wrote a two-part series in Historically Speaking in September 2021 that you might find of interest.

https://www.oakridger.com/story/lifestyle/2021/09/24/scientist-writer-and-orhs-grad-katherine-xue-part-one/5802356001/

https://www.oakridger.com/story/lifestyle/2021/10/01/orhs-grad-katherine-xue-part-2-research-galapagos-honeymoon/5903005001/



Katherine Xue, an Oak Ridge schools graduate, is doing valuable microbial research