

AERIAL ASSOCIATES PHOTOGRAPHY/ZACHARY HASLICK



**HARMFUL ALGAL BLOOMS** surround Lake Erie's western shore in Monroe, Michigan. Fellows working with the Ohio State University in the new NOAA Climate-Ready Workforce initiative will study and assess the health risks of similar blooms.

industries nationwide.

Other agencies also aim to build workforces in climate resiliency. The Depart-

ment of Energy is investing in renewable energy infrastructure in fiscal year 2025, including \$385 million toward weather-

izing low-income homes and \$95 million toward various Tribal energy projects. The Environmental Protection Agency's Clean Water State Revolving Fund has invested \$172 billion into improving water quality infrastructure over the past 36 years. The Department of Transportation provides funding to communities for safe transportation to escape from natural hazards and extreme weather events.

Gardiner stresses the urgency of developing a workforce to combat climate change impacts. "We need to focus on climate concerns. Ignorance won't protect anyone," he says. Over the coming months and years, NOAA will work with project leads to assess how the jobs benefit the participants and their communities.

**Hannah H. Means**

## Q&A: Rebecca Smethurst, black hole researcher and YouTube star

*Dr. Becky* aims to shrink the gender imbalance in the viewership of her astronomy videos.

**R**ebbecca Smethurst loves astrophysics. She also loves talking about it. That passion led her to start regularly posting to her YouTube channel, *Dr. Becky*, six years ago. Her videos mainly cover new astronomy research findings. Also on the platform, she hosts a monthly series called *Night Sky News*, where she discusses celestial objects and events amateur astronomers can observe in the coming weeks. In other videos she reacts to pop culture space references in songs, TV shows, movies, and memes.

Smethurst finds inspiration for videos in her daily life, including seminars, journal clubs, and the news. She also tries to market content so YouTube recommends it to more women. About 45% of YouTube's global user-ship identifies as female, but only 10% of Smethurst's audience identifies as female. The *Dr. Becky* channel has amassed over 760 000 subscribers and 85 million cumulative views, with videos averaging a half million views apiece. In 2020 her contributions to



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physics engagement were recognized with the Mary Somerville Medal and Prize bestowed by the UK's Institute of Physics.

In 2017 Smethurst earned her PhD

in astrophysics at the University of Oxford. She completed research fellowships at the University of Nottingham in 2018 and at the University of Oxford in 2022. She is still at Oxford,

where she splits her time between research on supermassive black holes and her YouTube activities. Smethurst also cohosts *The Supermassive Podcast* and has published two popular books on astronomy.

**PT:** Describe your path in astrophysics.

**SMETHURST:** I really disliked physics at school up until the age of 14. I thought it was boring. Then at 15 I learned that astronomy, which I absolutely loved, was physics. My thought was that I would work in the UK space industry. I got an engineering graduate role straight out of university. But I realized within two months that I wasn't happy. I remember calling my supervisor for the research I did in my final year of university and saying, "I've made a terrible mistake." I really wanted to come back to astrophysics.

**PT:** What does your research at Oxford focus on?

**SMETHURST:** Every galaxy in the universe, we think, has a black hole that is a million to tens of billions of times more massive than the Sun. The question is, how did those black holes become so massive? For a long time, astrophysicists thought it was through the merging of galaxies. We see a really tight correlation between the mass of stars in a galaxy's bulge and the mass of the galaxy's supermassive black hole. But when my colleagues and I measured the black hole masses in galaxies without classic bulges, we still saw massive black holes. You couldn't explain why they were so massive despite their lack of merging activity.

My work focuses on how the massive black holes form without a merger and how often. I analyze data sets from Galaxy Zoo and the Sloan Digital Sky Survey. I also work very closely with people who run simulations of the universe to work out where mass comes from that ends up in black holes.

**PT:** What led you to start making YouTube content?

**SMETHURST:** My first job after my PhD was a research position at the University of Nottingham. The bonus was that every couple of months I would make

YouTube videos for a channel called *Sixty Symbols*. I would chat at a camera for an hour about astronomy.

After two years, I got a research position at the University of Oxford, and I set up my own YouTube channel. It felt like doing another PhD in video production. My early videos are badly lit, the audio is terrible, and it's sometimes blurry. But I'm so happy that people just like to chat about space.

There's this narrative in society that physics and math are really hard, and unless you're really smart, you can't ever contemplate understanding them. I think that's crazy. I've always been really passionate about explaining physics to people who may have thought they couldn't understand it before.

**PT:** You worked at a wedding venue bar during your undergraduate summers. Is there anything about that job that is relevant to what you're doing now?

**SMETHURST:** I would have conversations with people who otherwise wouldn't have even thought to go to a science museum. We'd talk about the physics of golf, and then eventually, long after they'd finished their last drinks, we would end up talking about the end of the universe. I started to learn how to explain things to someone with no science background.

**PT:** What are your goals for the channel, and do you feel like you're meeting them?

**SMETHURST:** I'd like to eventually see a 50-50 gender split in my viewership. Right now it is more like 90-10 in favor of men, so my goal is to reach more women. That involves normalizing across society that physics is not just a subject for boys, but also normalizing there aren't any subjects for a specific gender. Also, you can't even out the gender split in physics, computer science, and math without evening out the gender split in psychology and English, which are heavily female biased.

I want to make content that the YouTube algorithm thinks more women and younger people would want to see. Some of my attempts have massively failed. One video I'm proud of explains the space references in Taylor Swift songs. I

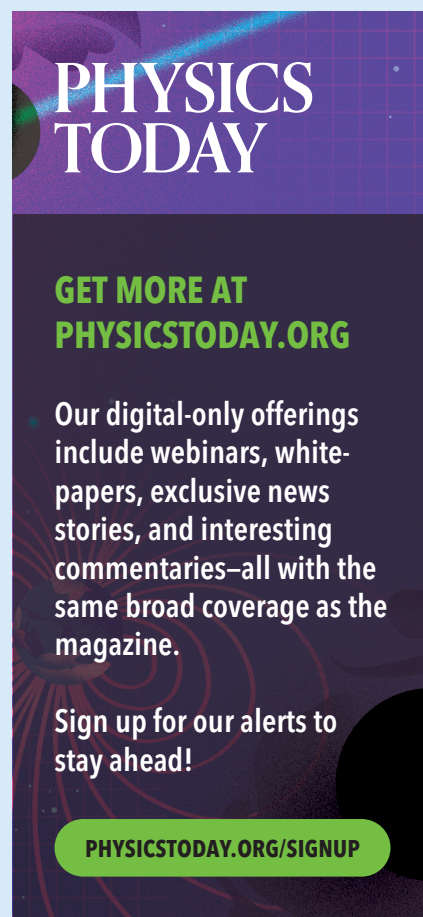
thought it would get a lot of love from a female audience, but it seemed to reach older men instead. But maybe I convinced more men to listen to Taylor Swift. Sometimes the YouTube algorithm doesn't behave as you expect it to, and I'm always guessing with these things. I'm trying to figure out how to get the algorithms to recommend my content to more women.

**PT:** What's the biggest problem that you see in science communication today?

**SMETHURST:** Overhyping things. I am guilty of this too. People sometimes make assertions that they were the first to find something. But claims about being first, or about the significance of a discovery, are not always true—and they shouldn't be made before going through a rigorous review process. The resulting arguments can cause uncertainty for the public.

I think that's one of the biggest problems we science communicators have: getting across that science is confusing—and that's okay.

Hannah H. Means **PT**

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