

<https://doi.org/10.1063/PT.6.4.20231121a>

PHYSICS TODAY

Physicist shatters record for running across the US

21 November 2023

After making a seven-week journey from San Francisco to New York City, Jenny Hoffman is back researching quantum materials at Harvard.

Toni Feder



Jenny Hoffman runs along US Route 6 in Nevada on 21 September. Credit: Jill Yeomans

As Jenny Hoffman approached the George Washington Bridge on the evening of 2 November, she was greeted by the flashing lights and blaring sirens of a police escort and a growing crowd of friends who accompanied her the final few miles to New York's City Hall. The Harvard University physics professor was about to break the world record for the fastest crossing of the US on foot by a woman; she bested the [previous mark](#) by more than a week.

Hoffman set out on 16 September from San Francisco. Over the course of 47 days, 12 hours, and 35 minutes she [covered 3032 miles](#) (4880 kilometers) and wore out 11 pairs of shoes. Each day she averaged about 63 miles in 15 hours on the road.

“An amazing team supported me,” Hoffman says. “I felt empowered by our shared experience and sisterhood.” Her crew chief drove an RV and managed logistics, including communications, routing, nutrition, and equipment. Five other volunteers—including physics and engineering graduate students from Harvard and MIT—took shorter stints driving a car to deliver food, orange soda, and sunscreen to her every few miles.

Hoffman ran mostly on the shoulders of two-lane roads. Because she had to stay alert to cars passing from behind and to mud, rockslides, and animals, there were no diversions: no music, podcasts, or audiobooks except for during a quiet 169-mile desert stretch.

Three days after her triumphant arrival in New York, Hoffman was back at Harvard, where she leads a research group studying quantum materials. Her research includes synthesizing interfaces between superconductors and topological materials and using scanning probe microscopy to visualize and manipulate excitations at the atomic scale. “I’m struggling a bit to readjust to a world in which I have to decide every minute of every hour how to spend my time, after seven weeks of knowing that the only thing I had to do every day was get up and run,” she says.



Jenny Hoffman’s students and postdocs welcome her (standing, center) back to Harvard University after she set a record for running across the US. Credit: Grace Pan

Hoffman also advises undergraduates studying [acoustic metamaterials](#)—engineered periodic structures with properties determined by their macroscopic geometry rather than by their microscopic constituent materials. The students design and 3D-print samples, launch sound waves through them, and map the frequency-dependent amplitude and phase response.

“These are \$100, fast experiments,” says Hoffman. The acoustic dispersion relations that the undergraduates measure are analogous to the electronic band structures of quantum materials that her graduate students extract with a scanning tunneling microscope, “which is a \$1 million piece of equipment.”

The acoustic metamaterials research may have applications, such as in topologically switchable sound barriers and invisibility cloaks for sonar, says Hoffman. For now, though, she is more interested in the pedagogy. “This is a way to teach undergraduates solid-state physics, to teach them how to do experiments, and to give them ownership over a project that is affordable.”

Running is a good balance for physics, says Hoffman, who got into running in seventh grade and into ultrarunning—covering distances longer than marathons—when she was a graduate student at the University of California, Berkeley. In physics, she explains, luck plays a large role in success and failure: “Does your cryostat leak?” for example. In running, she says, “there is more correlation between hard work and success. The numbers are what they are. You finish in a certain time. And there is no anonymous peer reviewer who will undermine that. It’s good for my mental health to have a pursuit that is more clearly merit based and fact based.”

For both running and physics, Hoffman has relied on hard work. “I’m driven and detail oriented,” she says. “That lends itself both to doing science and to training and getting the details right for an extremely long run.”

Hoffman is compiling GPS data, witness statements, and videos of her feat to send to Guinness World Records for ratification.