W SARS-C V- ( )
world, 2020 immediately became a historic year. e virus recognized no boundaries; neither physical nor political. Our Cold Spring Harbor Asia conference center employees in Suzhou, China,

Dave Micklos and his team pivoted to alternatives that could support both at-home and classroom learning from a distance. The DNALC developed

which it uses to in ltrate host cells. is is the protein now targeted by vaccines and experimental therapies. Early in the pandemic, the availability ARSing33 proteis. vetal0.4

e single-dose vaccine developed by Johnson & Johnson in collaboration with Beth Israel Deaconess Medical Center also directs the body to produce an immune-stimulating viral protein. In this case, the instructions are encoded in DNA and delivered to cells using a modi ed adenovirus as a vector. CSHL scientists, myself included, studied adenoviruses extensively in the 1970s and 80s, primarily for cancer research. Terri Grodzicker, who is now our dean of academic a airs, Yasha Gluzman, and Robert Tjian developed adenovirus vectors to deliver genetic instructions to human cells to direct them to produce a foreign protein. In my lab, we gured out how to grow the human cells used for this system in suspension culture rather than on plastic dishes, so adenovirus could be produced on a much larger scale. e cells and viruses have been modi ed over the years, but adenovirus vectors got their start here at CSHL and are now part of approved vaccines for COVID-19.

COVID-19 Research

As these examples illustrate, we can't fully appreciate in the present how the fundamental discoveries our scientists are making might be used in the future. But I'd like to highlight some ways in which CSHL researchers have contributed directly to addressing the current crisis. Regardless of what their labs were studying when the pandemic hit, many of our researchers readily pivoted to investigating the virus and its e ects.

One area of intense focus for those working to rein in the e ects of SARS-CoV-2 has been the virus's spike protein,

While working from home early during the pandemic, CSHL Fellow Jason Sheltzer and collaborator Joan Smith, an engineer at Google, made important discoveries about the ACE2 receptor on the surface of human cells that SARS-CoV-2 uses to get inside. Using data from previous studies, they found evidence that cigarette smoke drives cells to make more of this receptor—thus creating more access points for the virus. is may explain why people who smoke are among those who are most vulnerable to infection with SARS-CoV-2.

Finally, cancer biologist Mikala Egeblad has organized

pathogens and amplify support for research aimed at dealing with infectious bacteria that no longer respond to our existing arsenal of drugs.

Regardless of what crisis we face next, it's clear from the devastating way the COVID-19 pandemic has progressed and persisted that we'll need strong national leadership and coordination. A nationwide, Federal coordinating body should be in place for all future medical emergencies to oversee national, state, and local health agencies, to set policies, and to secure and distribute essential supplies, even engaging the armed services in a more e ective way. And these actions must be supported by sound science. CSHL's research and educational programs are helping to ensure that science will be ready. Rebecca Leshan, the executive director of the CSHL Banbury Center, is planning strategy ses-

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