just as the pandemic was taking hold in the United States, but the team was able to get the research started by focusing on pen-and-paper designs and software simulations.

However, the pandemic may prove more problematic for Johnson’s second endeavor. It involves the design of a new breed of high-efficiency power electronics that converts DC power from solar cells into grid-compatible AC power. “For that project, we have a heavy set of milestones coming up in the summer months to actually demonstrate the hardware,” says Johnson. “If we can’t do [tests] in the summer, we’re going to have to start coming up with some contingency plans. Since these experiments necessitate a power lab with specialized equipment, they cannot be done in our homes.”

While the pandemic affects each research project to varying degrees, its overall impact on the broader shift toward green tech—and on the state of engineering research more generally—is still unclear.

Benson says she’s slightly concerned that the pandemic may cause some researchers to shift their focus from climate change to medicine. “To me, the COVID-19 pandemic is sort of a multyear challenge and a short-term nightmare,” she says. “If we’re not careful, climate change will be a decadal-scale nightmare. So this work needs all of the attention it can get.”

Johnson is less concerned that the pandemic will interfere with the advancement of green tech, saying: “I think that energy is such an integral part of modern life itself and infrastructure that I don’t perceive [the COVID-19 pandemic] fundamentally altering the fact that we all need energy, and cheap energy.”

—MICHELLE HAMPSON

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and read back many times. “This is data in glass, not on glass,” says Ant Rowstron, a principal researcher and deputy lab director at Microsoft Research Lab in Cambridge, England.

Reading data from the glass requires an entirely different setup, which is one potential drawback of this method. Researchers shine different kinds of polarized light—in which light waves all oscillate in the same direction, rather than every which way—onto specific voxels. They capture the results with a camera. Then, machine-learning algorithms analyze those images and translate their measurements into data.

Ishak, who is also an adjunct professor of electrical engineering at Stanford University, is optimistic about the approach. “I’m sure that in the matter of a decade, we’ll see a whole new kind of storage that eclipses and dwarfs everything that we have today,” he says. “And I firmly believe that those pure materials like fused silica will definitely play a major role there.”

But many scientific and engineering challenges remain. “The writing process is hard to make reliable and repeatable, and [it’s hard] to minimize the time it takes to create a voxel,” says Rowstron. “The read process has been a challenge in figuring out how to read the data from the glass using the minimum signal possible from the glass.”

The Microsoft group has added error-correcting codes to improve the system’s accuracy and continues to refine its machine-learning algorithms to automate the read-back process. Already, the team has improved writing speeds by several orders of magnitude from when they began, though Rowstron declined to share absolute speeds.

The team is also considering what it means to store data for such a long time. “We are working on thinking what a Rosetta Stone for glass could look like to help people decode it in the future,” Rowstron says. —AMY NORDRUM