



COVID-19

As labs move to reopen, safety worries abound

Challenges include reorganizing work spaces and protecting human research subjects

By David Grimm

Russell Hopcroft spent much of April hunkered down in Fairbanks, Alaska, plotting how he'd return to research once the state ended its lockdown. On 23 April, he finally got the call—or rather, the Zoom: Over a video link, an official from the National Science Foundation said it was granting Hopcroft, a biological oceanographer at the University of Alaska, Fairbanks, permission to set sail on his ecological expedition to collect data on critical Gulf of Alaska fishing grounds.

It would be a voyage like no other. When the vessel left port last week, it held only three researchers, instead of the typical 24. The scientists were limited to 1 week at sea, not two, meaning they couldn't conduct their usual surveys of birds and marine mammals. And everyone on board was wearing face masks and practicing physical distancing, not a simple task for crews accustomed to working hands-on in close quarters.

"It will not be easy," Hopcroft said before he embarked. Still, he added, "I'm considering us pretty lucky."

Around the world, scientists are facing similar challenges in restarting their research.

The coronavirus pandemic has wreaked havoc on science, shuttering laboratories, aborting field projects, and costing researchers months—if not years—of work. Now, as many national and local governments ease lockdown restrictions, some lab- and field-work is starting to resume. But most labs will have to operate with just a few individuals at a time, working in shifts. All large gatherings, including lab meetings and lectures, are likely to be prohibited. And many institutions are still trying to figure out how and whether to test employees for SARS-CoV-2, the coronavirus causing the current pandemic, and what to do if infections resurge.

Organizations representing universities are planning to provide their member institutions with guidance on how to reopen their campuses. "It's generally agreed that research will be the first thing brought back," says Tobin Smith, vice president for policy at the Association of American Universities. "[It] will be a precursor to bringing students back and restarting other programs." Institutions will also get technical input next month from Jason, a group of academic scientists that typically

advises the U.S. government on national security matters.

Still, "We're not just going to be able to turn on the lights, walk in the door, and go back to normal," says Edward Hawrot, a senior associate dean at Brown University in Providence, Rhode Island, who is helping guide his institution's reopening efforts.

One big challenge facing labs is keeping workers far enough apart to reduce the risk of spreading SARS-CoV-2. Microbiologist Carolyn Coyne runs a 10-person lab at the University of Pittsburgh, where she studies

how viruses infect the intestines and placenta. When her lab reopens, perhaps next week, only half of her personnel will be allowed to work at any one time. She's creating a sign-up calendar, with lab benches, desks, and sterile workspaces marked in different colors. "Shifts will be limited to 4 hours," Coyne says, and everyone will wear masks.

An additional complication is that Coyne's laboratory bleeds into others as part of an "open lab" layout. "We not only must consider physical distancing within our own lab," she says, "but likely with the labs surrounding ours."

Neuroscientist Christian Haass was able to

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reopen his neurodegenerative research lab at the Ludwig Maximilian University of Munich in late April. He oversees about 120 people, but only one-quarter can work at any one time. His researchers have been able to get their experiments done by “working on weekends and late into the night,” he says. Making matters trickier is that the German government owns his half of the building, whereas the university owns the other half, meaning different safety rules. “The most extreme example,” he says, “is that we have to wear face masks, while others do not, even though we use a lot of facilities together.”

Reduced staffing levels could complicate life for some researchers. Ainara Sistiaga was nearly finished with her postdoctoral work studying ancient feces at the University of Copenhagen in Denmark when the pandemic hit. After several weeks at home, the dean granted her permission to resume her work. But because of the severe staffing restrictions the university has imposed—in some cases allowing as few as one person per building, Sistiaga says—she wouldn’t have the supervision needed to probe her delicate samples, some of which are more than 50,000 years old. She’s hoping new rules to be announced soon will allow more people in. “Until then,” she says, “I’m a bit stranded.”

For some scientists, persuading human subjects to come to campus poses complications. Researchers in cognitive neuroscientist Audrey Duarte’s lab at the Georgia Institute of Technology in Atlanta conduct brain scans on older adults—a population particularly susceptible to COVID-19. Duarte says she’s still waiting for instructions from her university about when and how to resume these studies. “When we can, a big question for us is: Should we? And are we even going to be able to recruit people?” she says. “I’ll never be able to say something like, ‘I can assure you that there’s no risk for you coming in.’”

Jennifer Blackford, a developmental psychologist at Vanderbilt University in Nashville, Tennessee, has similar concerns about participants in a study of childhood anxiety. “We’re up in kids’ faces, putting electrodes on their body,” she says. The medical center where Blackford’s lab is housed has instituted temperature screening at every entrance. Still, she says, “We may end up in a situation where our families don’t want to come in.”

Many studies will be slow to resume because scientists are cut off from their research animals. Neuroscientist Wang Minyan of Xi’an Jiaotong-Liverpool University in Suzhou, China, uses mouse brain tissue to study the biology of migraines. She works in col-

laboration with Soochow University, where the rodents are housed. Wang’s own laboratory has reopened, but because of restrictions on access to the Soochow campus her team can’t retrieve the mice or collect samples for analysis. This particularly affects two Ph.D. students who need the mouse tissue to keep their thesis research on track, she says.

To prevent early-career researchers from being professionally derailed by the pandemic, many institutions are extending tenure clocks, providing additional funding for grad students, and creating new positions that would allow postdocs to stay longer. But some of these scientists will still be



Ainara Sistiaga studies ancient feces, but has been unable to return to her lab because she won’t have the supervision she needs.

reluctant—or unable—to return.

Alex Kolodkin, a neuroscientist at Johns Hopkins University in Baltimore, says one of his students has complex rheumatoid arthritis, putting him at high risk for complications from the virus. Other young researchers may need to remain at home to care for children or sick family members. And Ulrike Diebold, a physicist at the Vienna Institute of Technology, says she has a Serbian student close to finishing his dissertation who, because of pandemic travel restrictions, is unable to return to Austria. A different student, from Iran, was supposed to start last month. “He’s stuck there, too, who knows how long.”

Returning to work has been especially difficult in places such as Wuhan, China, the center of the original outbreak. Although new infections are now rare, and factories, shops, and restaurants are opening, a special permit is needed to enter Wuhan University and going into campus buildings requires an additional health screening, says Stephen McClure, a scientific writing specialist at the university. So employees are still working remotely, he says. “Universities [in the region] will be almost the last places to reopen.”

Some labs will have to adjust less than others. Researchers in archaeogeneticist

Johannes Krause’s lab at the Max Planck Institute for the Science of Human History in Jena, Germany, are already well protected from the virus. They extract DNA from ancient human remains in a giant clean room, where scientists must don masks and full bodysuits to avoid contaminating their samples. “My sister is a schoolteacher, and she thinks wearing a mask is the worst thing ever,” Krause laughs. “I’ve been doing it for 7 years.”

Other labs have had a different kind of practice. John O’Meara, chief scientist at the W. M. Keck Observatory in Hawaii, says a small crew will operate the two telescopes at the top of the island’s dormant volcano now that the state is easing restrictions. Work to develop and maintain the telescopes’ instruments will be limited, and one collaborator on the mainland has even had to test new instruments in his own garage. But O’Meara says his crew is used to disruptions. Last year, protests against the Thirty Meter Telescope, to be built nearby, closed the observatory for weeks. “We’ve had an unplanned dry run for this,” he says.

Reopened labs will need to prepare for disruptions if the virus resurges. Janet Hering, director of the Swiss Federal Institute of Aquatic Science and Technology in Dübendorf, says her staff of about 500 people began a stepwise return to work last week. One mandate: “Don’t start new projects, and don’t start projects that cannot be stopped again on short notice.”

Hering hopes the shutdown will prompt researchers to rethink simply returning to business as usual. “I do hope that the [pandemic] experience would prompt reflections on some of our past habits, including intensive travel, especially for conferences,” she says. Other changes may also stick. Several researchers say the Zoom-ification of their world has increased attendance at everything from lab meetings to thesis defenses—leading to unprecedented levels of collaboration. “When we were in the building, only about 30 to 40 people would attend our weekly lab meeting,” Krause says. “Now, we have twice that number, and all of our group leaders are present.” The pandemic, he says, “will change the way we organize our day, and even how we communicate.”

Once the pandemic abates, Sistiaga hopes scientific leaders won’t stop thinking ahead. “My main concern is not the short term,” she says. “It’s the long term of how my generation is going to fare in this new world.” ■

With reporting by Daniel Clery, Jeffrey Mervis, Dennis Normile, Elizabeth Pennisi, Kelly Servick, and John Travis.

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