



Social-distancing measures are advertised at the University of Glasgow, UK.

ANDY BUCHANAN/AFP/GETTY

## WHAT IT'S REALLY LIKE TO DO SCIENCE AMID COVID-19

From Germany to India, researchers are grappling with how to run labs and lessons under extraordinary restrictions.

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**A** new academic term has started in much of the world, but the return to studies came with disruption from the COVID-19 outbreak and a surge in infections in many regions.

Many universities have welcomed students and researchers back to campus – but have implemented unprecedented safety and social-distancing measures, which often hinder teaching and laboratory work. And despite these, campus outbreaks are a major concern worldwide.

Remote instruction has become the norm in many places. And for those who had already returned to the lab and adapted their work

procedures because of the pandemic, the return of teaching brings an increased burden as they try to balance safety with the needs of students. Maintaining research necessities such as animal lineages can also be a struggle under the control measures. “Even in labs that are open, research is restricted,” says Jamal Nasir, a geneticist at the University of Northampton, UK, who is returning to his lab after six months away.

*Nature* looks how academics in four countries are coping during the pandemic.

### Brazil: ‘The loss to research is irreparable’

Brazil has no national strategy to guide its 110 federal universities and institutes on how to resume activities as the semester gets under way. Most are delivering teaching remotely.

At universities where campus access is restricted, and services such as animal-research facilities have been left without technicians, researchers have had to cancel or indefinitely postpone projects. “It is impossible to continue the work,” says João Santana da Silva, an immunologist at the University of São Paulo in Ribeirão Preto. “We are struggling to maintain animal lineages and parasite strains and to minimize the damage. The loss in research and human resources is irreparable.”

The lack of a clear national policy means that, in practice, it has been up to individual researchers to implement the rules, says Ricardo Gazzinelli, an infectious-disease researcher at the Oswaldo Cruz Foundation in Belo Horizonte.

Gazzinelli, who coordinates a team of around 50 people working on a coronavirus

vaccine and diagnostic tests for COVID-19, decided to ask everyone who entered his 2 labs to take a coronavirus test every 15 days. He also staggered work times, and asked everyone to use masks and to maintain social distancing. The testing identified one infected person, who was asked to stay at home.

Others have seen their research fall into limbo. A group of scientists who were planning to travel to the Amazon rainforest to study malaria transmission found their efforts disrupted by travel restrictions and concerns about putting communities and themselves at risk. “Field work was practically paralysed,” says Gazzinelli.

Many students are struggling to cope with the stress brought on by disruption to their projects, getting COVID-19 or losing relatives to the disease, says Leticia Couto Garcia, a restoration ecologist at the University of Mato Grosso do Sul in Campo Grande. “The situation is quite difficult,” she says.

### United Kingdom: Campus outbreaks surge

The return to universities in the United Kingdom has coincided with a surge in daily infections with COVID-19. More than 100 universities have reported coronavirus cases.

The outbreaks have prompted teaching unions to call for an end to face-to-face lectures. “We are not prepared to take chances with the health and safety of students, staff or local communities,” says Jo Grady, general secretary of the University and College Union, which represents academics.

Government guidance says that higher-education institutions should open. It says that there is no scientific basis to suggest that face-to-face teaching is unsafe, as long as staff take measures to manage the risk of SARS-CoV-2 transmission. Most institutions plan to offer in-person teaching: 89 of the 92 surveyed by the umbrella organization Universities UK said that they would do so this autumn when it is safe. Many, including the University of Cambridge and the University of Manchester, are offering a mix of online and in-person tuition to students.

Many researchers, meanwhile, have already adjusted to life in the lab amid the pandemic. Giampaolo Pitruzzello, a physicist at the University of York, returned to work in June. His lab has introduced an online system for booking time slots. Capacity is limited, and social distancing and face masks are mandatory. Pitruzzello says he feels safe. “There are hand sanitizers everywhere, and there is a one-way system in the corridor, so it is actually rare to meet another person,” he adds.

### Germany: ‘Online tools are makeshift’

In the winter semester, German universities, which began their academic year on 1 October,



Students wear face masks at Abdul Kalam Technical University in Noida, India.

are hoping to take a step towards normality. But this comes as COVID-19 infections rise again in Germany.

Germany’s roughly 100 research universities have set out similar plans for the term. These universities want to gradually restart in-person teaching. This year, lectures will start in November, and some students will return to campuses – albeit in limited numbers – where they will be subject to social-distancing rules.

Special provisions to help universities to prevent the spread of the virus and keep people safe vary from state to state, and might change depending on local infection numbers. For example, in Bavaria, where new infections

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have been rising faster in recent weeks than in most other states, a maximum of 200 students will be allowed to attend lectures, and they must stay at least 1.5 metres from each other.

The set-up isn’t ideal, say researchers. “Students must be able to meet their teachers in person every so often,” says Jörn Birkmann, who teaches spatial and regional planning at the University of Stuttgart in Baden-Württemberg. “Online tools that lack interactivity are but a makeshift.”

Since March, research has generally suffered less disruption than has teaching. Urgent lab work and experiments continued even during the lockdown, and most scientists have now returned to the bench.

“It’s awkward to make precision measurements or calibrate magnetic sensors with a mouth and nose mask on,” says Peter Fierlinger,

a neutron researcher at the Technical University of Munich. But despite some restrictions, meeting group members every day and discussing data over coffee is better than working from home most of the time, he says. “Scientists are pragmatic people who know how to get by.”

### India: Lack of Internet poses problems

India imposed a nationwide lockdown in March, and although restrictions are easing, higher-education institutions have so far opened only for researchers and post-graduate students who need to carry out lab work. That means that most undergraduates are not yet allowed to return to campus, and teaching must be done remotely.

The situation has created problems for those who can’t easily get online. Ananda Bharadvaja, a physicist at the Bhaskaracharya College of Applied Sciences in Delhi, says that some of his students do not have access to computers, which he has tried to address by pairing them up with others who do.

The shift online is disrupting scientific subjects that involve practical work. Undergraduate physics students are forgoing lab experience in topics such as thermodynamics, says Bharadvaja.

Those who have been allowed to return to the lab face safety measures, such as social distancing, staggered shifts and mask-wearing. Several universities are taking the temperatures of people entering their campuses.

Safety measures are an ongoing discussion, says Gautam Menon, a biophysicist at Ashoka University at Sonapat near Delhi. “Thermal scanning is not particularly efficient,” he says. And although tests for COVID-19 are becoming cheaper and more accurate, “there will be considerable challenges in doing this across campuses in India”.