



## INFECTIOUS DISEASES

# Coronavirus epidemic snarls science worldwide

Experiments are halted as China remains locked down; many conferences are canceled

By **Robert F. Service**

**T**he coronavirus epidemic now racing across China is forcing Jeffrey Erlich, a Canadian neuroscientist at New York University Shanghai, to weigh his science against concern for his staff. Erlich performs animal experiments at a neighboring university; as part of efforts to control the illness, known as COVID-19, officials there have asked him to halt the studies and use as few staff as possible to take care of his animals. But he is training mice and other species on very complex tasks; the interruption could set him back 6 to 9 months. “It’s really hard balancing the research productivity of the lab and the safety and comfort of my staff,” he says. “When you’ve invested years of work into experiments, where do you draw the line about what’s considered essential?”

Erlich is just one of thousands of scientists in China whose work is suffering. Universities across the country have been closed since the Lunar New Year, 25 January. Access to labs is restricted, and projects have been mothballed, fieldwork interrupted, and travel severely curtailed. Scientists elsewhere in the world are feeling the impact as well, as collaborations with China are on pause and many scientific meetings, some as far away as June, have been canceled or postponed.

The damage to research pales compared with the human suffering wrought by the virus. As *Science* went to press, the total number of cases had risen to 73,332, almost

99% of them in China, and 1873 deaths had been counted; the specter of a pandemic is still very real. Still, for individual researchers the losses can be serious—and stressful. “Basically, everything has completely stopped,” says John Speakman, who runs an animal behavior lab at the Chinese Academy of Sciences (CAS) in Beijing. “The disruption is enormous. The stress on the staff is really high.” But Speakman says he understands why the Chinese government closed universities and institutes. “It’s annoying, but I completely support what they have done,” he says.

Disruptions are particularly acute in Wuhan and other cities in Hubei province, the epicenter of the outbreak, which are almost completely cut off from the outside world. “I’m working more now than ever before the epidemic,” says Sara Platto, a professor of animal behavior at Jiangnan University in Wuhan. But she faces major obstacles: Faculty and students living on campus are confined to their apartments, and Platto, who lives off-campus, can venture outside only once every 3 days. She is working with colleagues in Beijing who are studying the relationship of the novel virus to another coronavirus isolated from a pangolin. But a paper she is writing has been delayed because her notes are in her office and she can’t get back on campus.

The situation is not much better in other cities. “Unfortunately, the virus is very annoying with regards to work,” says Jingmai O’Connor, a paleontologist at CAS’s Institute for Vertebrate Paleontology in Beijing. “There is no one working the collection,

no one to sign paperwork so things can’t get done, overseas travel is canceled. ... No samples can be analyzed, all we can do is work on pre-existing data on our computers,” O’Connor says. “It sucks!”

Some researchers in China have switched from lab work to writing papers and grant applications. The National Science Foundation of China has postponed grant application deadlines by several weeks, giving researchers time to catch up. Online classes, which many universities and institutes have ramped up to keep students on schedule, are also keeping scientists busy. Poo Muming, a neuroscientist at CAS’s Center for Excellence in Brain Science and Intelligence Technology, says he is teaching daily 2-hour neurobiology lectures: “Surprisingly, there are thousands of people tuning in each day.”

China’s lockdown is felt even half a world away. Daniel Kammen, a renewable energy researcher at the University of California, Berkeley, says it is impeding his lab’s efforts to help set up green transportation projects, including the roll-out of electric taxis, throughout China.

But labs working on the fight against COVID-19 are in overdrive. At Tsinghua University in Beijing, Zhang Linqi has switched from HIV to the novel coronavirus; his lab members even decided to forgo the Lunar New Year celebrations last month. “[We] decided we would celebrate it by conducting research,” Zhang says. The team synthesized and characterized the “spike” on the coronavirus’s surface, a protein that helps it enter

Like most universities in China, the campus of Huazhong University of Science and Technology in Wuhan is deserted.

human cells; Zhang's lab has joined industrial partners to develop a vaccine targeting the spike. Countless infectious disease labs in the rest of the world have put their regular work on hold as well. "The main effect has been the need to triage work, to push other projects to the back burner while we help our Chinese colleagues analyze the vast amount of new COVID-19 data," says Christopher Dye of the University of Oxford.

The spread of the virus has upended plans for numerous scientific conferences. So far, more than a dozen have been canceled or postponed—not just in China but elsewhere in Asia and Europe as well. Among the casualties are the International Society for Stem Cell Research's international symposium, which was scheduled for March in Shanghai, and the 2nd Singapore ECS Symposium on Energy Materials in early April. Organizers of the International Congress on Infectious Diseases, planned for 20-24 February in Kuala Lumpur, Malaysia, postponed their meeting, saying the priority for its registrants is to fight the coronavirus outbreak in their home countries.

Concern is also rising that the epidemic could disrupt the global medicine supply. China and India produce an estimated 80% of all active pharmaceutical ingredients, the raw materials for antibiotics and drugs for cancer, heart disease, and diabetes. With many Chinese factories shuttered, stockpiles could run short. "This is a very acute issue now," says Michael Osterholm, the head of the Center for Infectious Disease Research and Policy at the University of Minnesota, Minneapolis, which studies drug availability.

But Mariângela Simão, assistant director general for access to medicines and health products at the World Health Organization, says the agency sees no "immediate risk" of COVID-19 affecting supplies of essential medicines. Simão's team is in daily contact with international pharmaceutical associations, which track shipping disruptions from their member companies. Many companies stockpiled 2 to 4 months of their products prior to the Lunar New Year celebrations, she says. And while Hubei is home to some pharmaceutical companies, far more are in Shanghai and other parts of China that are less affected. But the picture could change if the virus isn't brought under control, Simão notes. "It will all depend on how the situations evolve with the outbreak." ■

With reporting by Dennis Normile, Gretchen Vogel, Jon Cohen, and freelance journalist Rebecca Kanthor in Shanghai.

## SCIENTIFIC COMMUNITY

# Microbiome researcher accused of sexual misconduct

Questions arise about the work of researcher Jeff Leach, known for studies of Hadza hunter-gatherers in Tanzania

By Gretchen Vogel

**A** researcher famed for his work on the microbiomes of hunter-gatherers has been accused by several women of sexual assault, according to U.S. court documents. Jeff Leach, a resident of Terlingua, Texas, co-founded a major open-source, crowdfunded project on the microbiome and is the co-author of multiple papers on gut microbes, including one in *Science*. In the publicity resulting from the allegations, other questions have emerged about Leach's academic qualifications and his behavior in the field.

The sexual assault accusations came to light as a result of a defamation suit Leach filed in September 2019. In July 2019, Katy Schwartz, who worked at the Terlingua tourist lodge that Leach runs, filed a police report alleging that he had sexually assaulted her. Schwartz did not press charges, but asserts in court documents that she wanted her experience documented because she feared Leach could be a danger to others.

In the wake of the lawsuit against Schwartz, three other local women filed affidavits. One alleged that Leach had assaulted her, putting his hand up her shorts "without any warning." A second alleged that he raped her in a "violent assault" for which "there was no consent." A third affidavit alleged that Leach sexually assaulted a woman, became violent during an argument, and threatened her with litigation.

Leach and his lawyer, Rae Leifeste, told *Science* that all the charges are unfounded and are a coordinated attack motivated by jealousy and disagreements over money. In an affidavit and in an email to *Science*, Leach says any sexual contact was consensual and claims that, after the alleged attacks, all of his accusers were friendly toward him in text messages and in other encounters.

On 6 February, Presiding Judge Stephen Ables ruled in favor of Schwartz's motion to dismiss the defamation lawsuit, based on "anti-SLAPP" (strategic lawsuits against public participation) laws that protect free speech. Leifeste is preparing an appeal.

Leach has collaborated with researchers at King's College London (KCL), the University of California, San Diego (UCSD), and Stanford University, among others, to study the bacteria that live in the gut and on the skin. He is known for gathering microbiome samples from hunter-gatherers to explore the idea that their microbiomes are healthier than those of people in industrialized societies.

In 2014, Leach gave himself a fecal transplant from a member of the Hadza group of Tanzania, an event widely covered by the media and billed as an effort to boost his health. A few months earlier, he was profiled in *Science* (17 January 2014, p. 241).

Media accounts have described Leach as an anthropologist, but he told *Science* last week that he does not have a Ph.D. On various papers he lists affiliations with the University of Leicester and the London School of Hygiene & Tropical Medicine. KCL officials say he was a visiting research scholar there from August 2016 until July 2018 but is no longer associated with the university. Leach says he is now pursuing a Ph.D. at the University of York, which officials there confirmed. Leach did not answer queries from *Science* about whether he has an undergraduate degree.

Some researchers who have worked with Leach distanced themselves from him in comments to *Science*. In 2012, UCSD microbiome researchers Jack Gilbert and Rob Knight founded the American Gut Project with Leach. The project invites members of the public to submit a skin swab or samples of feces or saliva and pay \$99 to have their microbes catalogued. Gilbert says he never met Leach in person, however. "That project



Microbiome researcher Jeff Leach

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