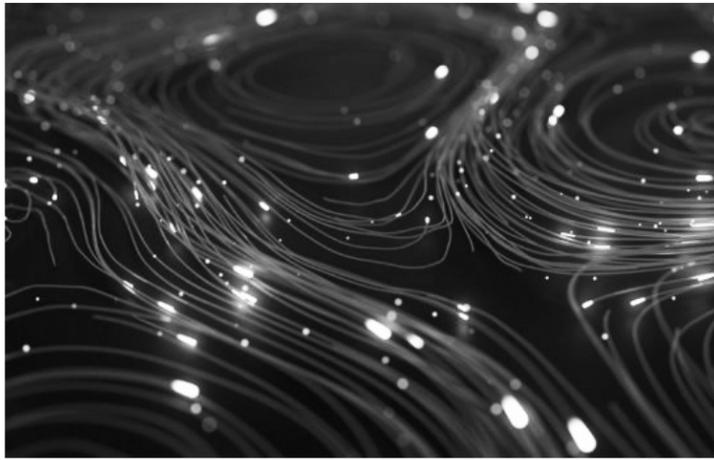


# Could fiber-optic technology be used to detect earthquakes?

IF you think that fiber-optic cables are only useful for providing high-speed internet access or cable TV, then think again, because they could also provide valuable information about hazardous events such as earthquakes and flooding.

Most often installed via underground networks of cables, fiber-optic technology can be used to monitor ground vibrations. It may sound surprising, but this "hidden function" of fiber-optic technology could prove particularly useful because geophones, the seismic monitoring devices traditionally used by geologists, are often difficult to install in urban areas due to high maintenance costs and risks of theft and vandalism.

Using fiber-optic distributed acoustic sensing (DAS) technology and existing telecommunication infrastructure, already in the ground, researchers



from Penn State University converted the fiber-optic cable under the faculty campus to 2,300 seismic sensors.

The researchers then continuously recorded ground vibration data. This was stored on a network-attached storage server to provide remote, real-time data access.

"We discovered the fibers

could pick up a wide variety of signal vibrations, from thunderstorms to human walking steps to music concerts. We can even distinguish the specific song at a concert by the patterns of the high and low tones. That's a great demonstration of the sensitivity of these sensors," explains Tiejuan Zhu, assistant professor of geophysics at Penn

State and principal investigator on the research, published in *Solid Earth*.

However, the data obtained via these sensors did not turn out to be as accurate as data obtained using traditional geophones. Still, the scientists hope to be able to overcome this limitation thanks to new fiber-optic technology, coming "in the next five years."

Among other things, the researchers now plan to use fiber-optic technology to monitor smaller events long-term, such as the underground movements

that can lead to sinkholes and flooding.

"Several experiments in California have been carried out by teams using existing telecommunication infrastructure. But deploying this technology on the East Coast is important because we have very special geology here," said Zhu.

This isn't the first time that scientists have put fiber-optic technology to use in observing and monitoring nature. It is notably used for offshore ocean observations and to monitor permafrost stability in the Arctic.

## DRILON...from page 1

But Lacson noted that there had been instances in the past when several active military and police officers held concurrent positions in some civilian entities.

"Maybe it's only a matter of questioning it before the Supreme Court and the Constitution is quite clear," he said.

"It is our position that after we adopt this committee report, then we should send a copy to the chief-of-staff of the AFP as well as to the Secretary of National Defense so this

violation of the Constitution should be rectified," he added.

Drilon concurred with Lacson, saying: "We submit that the suggested rectification should be part of the report. I would like to think that the rectification would be that Gen. Parlade should no longer be the spokesperson of the NTF-Elcac because that designation is of doubtful validity."

"We should include that as an amendment or as a recommendation of the chamber when we send out the report," he added.

## ANGER...from page 1

cameras.

"I'm a soldier of the Republic of Korea," she said, her voice breaking.

Police confirmed her death to AFP and said they were investigating.

Reports said no note was found but the death was being treated as suicide, with Yonhap citing officials saying she had tried to kill herself three months ago.

Her death triggered an outpouring of grief and calls for South Korean MPs to pass an anti-discrimination bill.

"The whole of Korean society bears responsibility for her death," said a poster on Daum, the country's second-largest portal.

"Those who ridiculed her and made malicious online comments because she was transgender, I want you to reflect on what you did to her."

**Childhood dream**  
South Korea has a conscript army to defend itself against the nuclear-armed North, with all able-bodied male citizens obliged to serve for nearly two years.

But Byun was a volunteer

non-commissioned officer and said at her press conference last year that serving in the military had always been her childhood dream.

"Putting aside my sexual identity, I want to show everyone that I can be one of the great soldiers defending this country," she continued, fighting back tears. "Please give me that chance."

Her case was the first of its kind in South Korea.

International rights groups have expressed concern about the way the country treats gay soldiers, who are banned from engaging in same-sex acts and can face up to two years in prison if caught — even though such actions are legal in civilian life.

Seo Ji-hyun, a prosecutor who triggered the country's #MeToo movement by going public over sexual harassment she suffered at the hands of her superior, declared following Byun's death: "We could have saved her... We just had to let her live life true to who she was."

"Right now anti-discrimination bill", she added as a

hashtag on her Facebook account.

A new bill was proposed last year to take on the country's deep-seated traditional social values, which are reinforced by powerful megachurches that condemn homosexuality.

The measure would ban favoritism based on sex, race, age, sexual orientation, disability or religion as well as several more unusual criteria such as criminal history, appearance and academic background.

More than a dozen attempts to pass broad anti-discrimination laws have failed over the past 14 years in the face of strong opposition from conservative churches and civic groups.

## FIRST...from page 1

but was reduced due to cargo limitations as the vaccine will be delivered using a commercial flight, vaccine czar Carlito Galvez Jr. explained.

The Philippines is expected to receive about 5.5 million to 9.2 million AstraZeneca vaccine doses this year through the COVAX facility.

## ANNE...from page 8

times," wrote Curtis.

The "BuyBust" star also made sure there were actual dahlias for the occasion, even if sourcing them was a challenge in the Philippines. Curtis tapped events stylist Gideon Hermosa for the setup.

"Here is to a year when absolutely nothing went accord-

ing to plan, except for this little bright light. When days crawled and months raced by. When [I] became a student again and she, my teacher. Happy 1st birthday," he said, sharing photos too of their celebration, where Dahlia fed her mom cake.

Curtis also marked the milestone with a UNICEF fundraiser to help marginalized kids. She

launched the fundraiser last month and has so far raised P650,000 out of the P1-million target.

The couple, who have been married since 2017, welcomed their firstborn while staying in Melbourne as the coronavirus pandemic spread across the world. They returned to the Philippines last month.

## INEQUALITY...from page 3

vaccines. Governments have resolved that the speed at which they can inoculate their peoples against the disease will determine how soon they can hope to revive their flagging economies. Hence, the massive attention given to the starting date of vaccine rollouts and the pace at which the actual jabs are given to people.

Governments everywhere are being judged by their citizens for the swiftness or sluggishness by which they are able to hustle for a sizable portion of the available vaccines. It is no longer a question of how much money a country has. What matters more is how much a government was willing to commit to the purchase of these vaccines even in their early stages of development. Those who hesitated now find themselves at the end of the queue. Case in point: the Duterte administration.

Interestingly, even the rich countries of Europe have not been spared. Here's a fascinating New York Times report dated Feb. 26: "In vaccine-hungry, cash-rich Europe, the hunt for more doses has nations trading with each other, weighing purchases from Russia and China, and fielding offers from middlemen ranging from real to outright frauds... An immense black — or at least gray — market has arisen, with pitches from around the world at often exorbitant prices. Sellers have approached EU governments claiming to offer 460 million doses of vaccines, according to the early results of an investigation by the bloc's anti-fraud agency that were shared with the New York Times."

That's the situation worldwide at this point. There's a global scarcity of COVID-19 vaccines. A handful of countries have cornered the limited supply, often in excess of what their own citizens actually need. But, what is unfolding within countries is equally disturbing. In some countries like the United States, glitches in the allocation of vaccines have meant that some local authorities could hoard supplies for second jabs while others have yet to get their first doses.

Well-defined and ethically sound systems of priority in vaccine distribution are willfully set aside in clear surrender to the imperatives governing traditional systems of privilege. In Latin America, people have watched with anger and dismay as the arrival of the first vaccines activated the virus of cronyism and preferential treatment. "Two ministers in Peru and one

in Argentina have resigned for receiving or giving preferential access to scarce vaccines. A minister in Ecuador is being investigated for doing the same." (NYT, Feb. 25)

Since we share structural similarities with Latin American societies, it is almost to be expected that the same privileged line-cutting ethos will be on full display when the highly regarded Western-made vaccines start coming in. We have seen early glimpses of this phenomenon in the widely-reported unauthorized distribution of China-made vaccines to favored parties late last year. Except that no one has felt duty-bound to explain how those vaccines got here and how they were administered to members of the Presidential Security Group without official FDA approval.

This exceptionalism, however, might be harder to criticize in the coming months because of the loophole provided by the existing tripartite scheme for vaccine procurement. The scheme, as we know, allows a few private companies and rich LGUs to order vaccines for their employees and constituents in partnership with the national government provided that, in the case of the private sector, half of the vaccines they buy are donated to the government.

What this means is that when the highly-rated vaccines like Pfizer, AstraZeneca, Moderna, and Novavax start trickling in, there will be separate lines of individuals who are exempted from the national government's priority system. These lucky few will get the vaccine sooner than most because they happen to be residents of affluent cities or employees or relatives/friends of the owners of big companies.

They will also get the vaccine of their choice, while the rest will have to take whichever vaccine is offered to them free. But, the bigger tragedy is that countless others will simply be left out or excluded, either because they are unable to get into the distribution system, or because they don't believe in the vaccine.

## Answers from Page 13

P	A	L	I	K	U	R	A	N	G
D	L	A	B	A	N	A	N	A	G
A	I	L	A	L	I	M	P	A	
T	I	P	G	A	T	A	S	A	
I	N	O	M	M	D	I	G	A	
U	R	A	L	H	A	L	A		
E	T	E	R	S	N	A	N	A	
M	I	S	A	M	I	S	N	O	
I	L	P	I	L	I	N	G		
R	B	A	L	A	N	G	A		
M	A	T	A	B	S	I	N	G	