

## Science

## 'Knowledge is powerful'

## Expert uses comics to explain 'science'

By Rita Giordano

A stalk of celery got **Jaye Gardiner** into science. As a precocious first grader in Chicago, she was invited to take part in a second-grade science class, where the students were conducting an experiment. Gardiner, who'd always been intrigued by science, was "super-excited".

The experiment was simple: Put stalks of celery into cups of colored water, then watch what happens. Over time, as the stalks absorbed the water, their leaves changed color to match the water. It was like magic to Gardiner.

"That was the first thing that had me go, 'What is this? How does this work?'" Gardiner said. "I would say that mystery, and that drive to solve puzzles, is probably what attracts me to science."



Gardiner

Gardiner is now 31 and a post-doctoral researcher at the Fox Chase Cancer Center in Philadelphia. She's studying pancreatic cancer and the tumor micro-environment. In the past, she's researched HIV and other viruses. She's also using her time at Fox Chase to learn the skills she will need to operate her own laboratory one day — a goal of hers.

But the little girl who got so excited about color-changing celery is still alive and well — and very much wants

to share that wonder with a wide range of folks, young and old, future scientists and non-scientists. That's why, these days, she's not just a scientist, but a science communicator, whose tools are less conventional than the test tubes and microscopes found in a lab.

In 2015, she co-founded JXX Comics — a website that uses comics to explain scientific concepts and diseases — with her friends Kelly Montgomery, now a grad student in at the University of California at San Francisco, and Khoa Tran, who is doing postdoctoral work at the University of Pennsylvania.

The trio's motto: "Science creates the narrative. We tell the story".

## Literacy

Their goal: "We simplify STEM concepts from multiple disciplines to create engaging comics to increase students' scientific literacy."

JXX Comics' target audience is middle-school age and up. Topics have ranged from cell division and Alzheimer's disease to a breakdown of the Epstein-Barr virus and political activism by scientists. The text is simple and straightforward, the illustrations colorful and playful.

Currently, the comics are available free on the JXX website, but the partners plan to put them into print and make them available to schools and libraries. Gardiner said the group has been exploring scholastic options with the Madison Reading Project, a Wisconsin nonprofit literacy program.

But science communication, like science comics, isn't just kid stuff. Making science accessible is about increasing science literacy at all ages, Gardiner believes.

"That's terribly important," she said, "because it helps everyone make more informed decisions about their health — or about different policies that affect their health."

Last year, Gardiner launched a line of scientist trading cards featuring profiles of scientists of diverse genders, ethnicities, and backgrounds. For now the cards are available online, but she hopes to eventually produce them for home and school use. They're intended to expand awareness of who scientists actually are.

"If you were to Google scientists, everyone you would get would look more like Albert Einstein, but so many more people do science," she said. "Literally anyone can be a scientist. You need to apply yourself, and you need to work hard. We're not all geniuses."

As a youngster, Gardiner was fortunate to have parents who encouraged her interests.

Gardiner is both the child of immigrants from Belize and a first-generation college graduate. Her mother and father stressed effort more than grades.

"So I would always put in more and more effort," she said. She was also lucky to have teachers who knew how to fire up students' enthusiasm and make material accessible. One of her favorites, Mr Coy, had his students write science-themed lyrics to the tune of Led Zeppelin's "Stairway to Heaven", which the class then fashioned into a video. It's a project she still remembers vividly, 15 years later.

"He made science so much fun that I fell completely in love with it," she said.

Because Gardiner's teachers made such a difference in her life, she's become passionate about doing the same for others, via teaching and mentoring. Until the pandemic shut things down, she was involved with Fox Chase's Teen Research Internship Program.

In addition, last year she was one of 125 women innovators in STEM selected by the American Association for the Advancement of Science to mentor girls middle-school age and up. She believes diversity in mentors is important for young people, to let them see the possibilities for themselves. But the diversity may also lead to scientific solutions brought about by new approaches to scientific problems.

## Experiences

"Everyone views the world through their own lens that is developed by the experiences they have had," she said. "In mentorship, diverse voices will breed diverse strategies to overcoming hardship, maneuvering careers, and acquiring success."

Gardiner still has a way to go in charting her own career, including two more years in her postdoctoral post at Fox Chase.

"What my actual position in the end will be is kind of unknown," she said. "I definitely think I'm making it up as I go along, and I'm not opposed to that idea."

What's certain is that her plans will include sharing the wonder that got a little girl in Chicago so jazzed about science to begin with.

"Science is a part of all our lives, whether we realize it or not. It can give a deeper appreciation for the things that we just take for granted," she said. "Just to know how things work — having that knowledge is powerful."

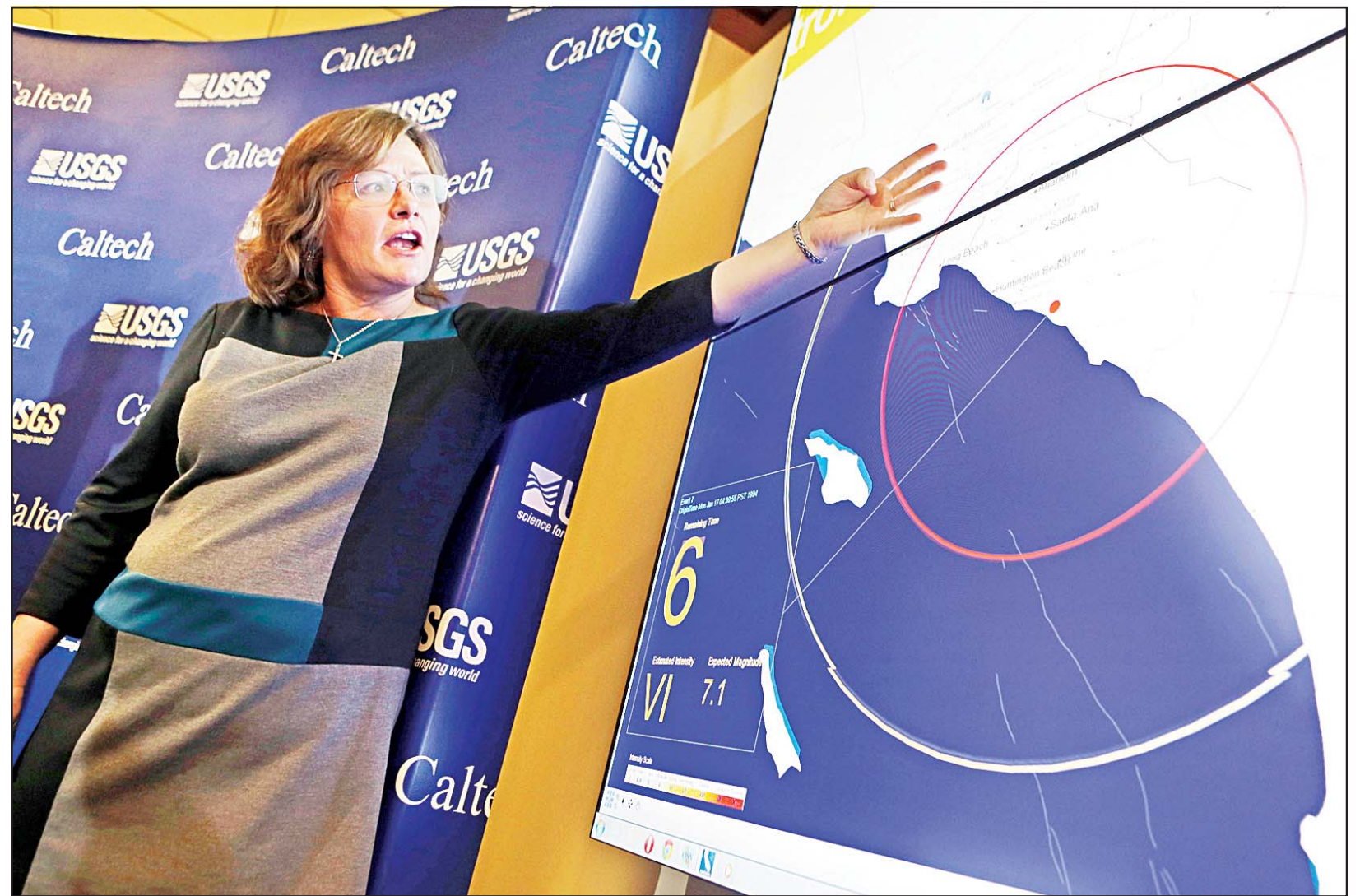
## Also:

**UNITED NATIONS:** A 350% increase in phishing websites was reported in the first quarter of the year, many targeting hospitals and health care systems and hindering their work responding to the COVID-19 pandemic, the UN counter-terrorism chief said last Thursday.

**Vladimir Voronkov** told the UN Security Council that the upsurge in phishing sites was part of "a significant rise in cyber-crime in recent months" reported by speakers at last month's first Virtual Counter-terrorism Week at the United Nations.

He said the UN and global experts don't yet fully understand "the impact and consequences of the pandemic on global peace and security, and more specifically on organized crime and terrorism."

"We know that terrorists are exploiting the significant disruption and economic hardships caused by COVID-19 to spread fear, hate and division and radicalize and recruit new followers," Voronkov said. "The increase in internet usage and cyber-crime during the pandemic further compounds the problem." (Agencies)



In this Jan 28, 2013 file photo, seismologist Dr Lucy Jones, describes how an early warning system would provide advance warning of an earthquake, at a news conference at the California Institute of Technology in Pasadena, Calif. (AP)

## Technology

## California gets alert system

## Android phones to track quakes

SACRAMENTO, Calif., Aug 12, (AP): Android phones will be used to sense earthquakes around the world and may one day be able to provide global warnings, with the first mass alert system unveiled Tuesday in California, Google announced.

Google, which helped develop Android, worked with California and the US Geological Survey to build the quake alerts into all phones that run the commonplace mobile operating system. Android users who have enabled location services and are near a quake of magnitude 4.5 or greater will receive a full-screen earthquake warning telling them to drop to the floor and seek cover.

The screen also will provide estimates of the quake's magnitude and distance from the user.

The alert is based on the projected shaking at a particular location and a certain level of intensity. Depending on their distance from a quake, people could get several seconds or perhaps a minute of warning.

The warnings are powered by California's ShakeAlert system, which uses signals from more than 700 seismometers installed around the state that can sense seismic waves.

However, users won't need to download the state's MyShake app in order to receive the alerts. That application, developed by the University of California, Berkeley and launched last year, has been downloaded by only about 1 million of California's 40 million residents. By contrast, many millions of people own Android phones.

"This announcement means that California's world-class earthquake early warning system will be a standard function on every Android phone — giving millions precious seconds to drop, cover and hold on when the big one hits," Gov Gavin Newsom said in a statement.

iPhone users won't receive the alerts through Apple's operating system, but they can download the MyShake app.

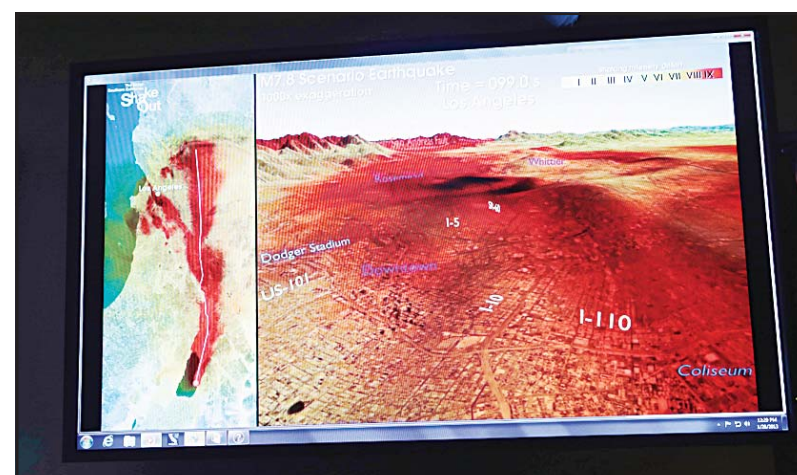
Also Tuesday, Google announced that Android phones will begin detecting earthquakes from around the world through their motion-sensing accelerometers.

"Your Android phone can be a mini-seismometer, joining millions of other Android phones out there to form the world's largest earthquake detection network," according to a Google blog post.

More than 2 billion devices run the Android operating system.

vent any further spillage. He thanked the thousands of volunteers who are working to contain the spread of the oil and to begin cleaning the shores. (AP)

**One side of lagoon polluted:** The Cerro Lagoon in the Paraguayan city of Limpio is sharply divided into two parts: one purple, one blue. One part emits a foul odor, the other doesn't.



In this Jan 28, 2013 file photo, a computer-generated graphic that demonstrates an earthquake early warning system is displayed at a news conference at the California Institute of Technology in Pasadena, Calif. California's earthquake early warnings will be a standard feature on all Android phones, bypassing the need for users to download the state's MyShake app in order to receive alerts, the Governor's Office of Emergency Services said. (AP)

## Pandemic hurts enforcement on suicide, child nudity: Facebook

OAKLAND, Calif., Aug 12, (AP): Facebook also announced Tuesday that it is banning caricatures of Black people in the form of blackface, as well as dehumanizing depictions of Jewish people that include images or other depictions of Jewish people running the world or controlling major institutions such as media networks, the economy or the government.

In The Netherlands and Belgium, images of Black Pete, or Zwarte Piet, that use blackface features and stereotyping characteristics will also be removed, the company said. Zwarte Piet is a sidekick of Sinterklaas, the Dutch version of St. Nicholas, a Santa-like character who brings children gifts in early December.

White people often don blackface makeup, red lipstick and curly black wigs to play Black Pete during street parties honoring Sinterklaas.

The character has been at the center of fierce and increasingly polarized debate in recent years between opponents who decry him as a racist caricature and supporters who defend him as an integral part of a cherished Dutch tradition. As a result, some towns and cities have phased out blackface at street parties.

An organization called Netherlands Is Improving welcomed the news. "Aug 11 is a happy day: From today, Black Pete is officially no longer welcome worldwide on Facebook and Instagram," the group said.

Others were less inclined to celebrate. Populist lawmaker Geert Wilders tweeted a photo of a Black Pete shortly after the Facebook announcement accompanied by the text: "Facebook and Instagram ban images of Zwarte Piet. The totalitarian state of the intolerant naging left-wing anti-racists is getting closer."

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This photo taken and provided by Sunil Dowarkasing, shows oil polluting the foreshore on the eastern side of Mauritius, after it leaked from the MV Wakashio, a bulk carrier ship that recently ran aground off the southeast coast of Mauritius on Aug 9. Residents of the Indian Ocean island nation of Mauritius are stuffing fabric sacks with sugarcane leaves to create makeshift oil spill barriers as tons of fuel has leaked from a grounded ship. (AP)



Benitez



Jugnauth

## Environment

**Urgent pumping removes oil:** In a race against tides and time, workers pumped tons of fuel on Tuesday from a Japanese bulk carrier ship grounded in the shallow waters of Mauritius to try to prevent a renewed oil spill from further fouling the island's eastern lagoons and shore.

The Japanese ship, MV Wakashio, ran aground on a coral reef about a mile off Mauritius on July 25, and prolonged pounding by heavy surf caused the vessel to crack about two weeks later. It spilled an estimated 1,000 tons of oil — about a quarter of the ship's total cargo — into the Indian Ocean, polluting the island's once pristine coastline.

Although the oil leak was stopped, the ship's hull was continuing to crack, prompting fears that the remaining fuel would gush into the sea.

By Tuesday, about 1,000 tons of the fuel had been pumped out of the stranded ship into small tankers nearby, according to a statement from the Wakashio's owner, Nagashiki Shipping. About 1,800 tons of fuel remained on the ship by midday and with efforts continuing, some experts expressed hope that all the fuel could be emptied from the ship before it breaks up.

"The situation is very tight. The pumping is continuing non-stop," said Sunil Dowarkasing, an environmental consultant and former member of parliament who was at the scene. "If all the oil can be successfully removed from the ship that would prevent any increase in the destruction, which is already an environmental disaster."

The ship's owners confirmed that the cracks inside the ship's hull had expanded. "The situation is being continuously monitored by a professional team of salvors," said the statement. "Since this ship is unable to navigate by itself, a tow connection has been established between a tug and the Wakashio, in order to secure the vessel so that it will not drift."

Of the 1,000 tons of oil that seeped from the ship, about 460 tons had been scooped out of the ocean, said the statement.

Mauritius Prime Minister **Pravind Jugnauth** said his government is working with the ship's owners to try to pre-

Several months ago, people began noticing that the water had changed on one side of the roadway and that fish and birds were dying. They went to local environmental authorities who took water samples.

"Three months ago all the fish died in the lagoon, thousands and thousands of them," said one resident, Herminia Meza. "The smell was unbearable and we were overwhelmed by flies. About a month ago the herons died and it turned a reddish color."

Francisco Ferreira, a technician at the National University Multidisciplinary Lab who took samples, has said that the color of the water is due to the presence of heavy metals like chromium, commonly used in the tanning of animal skins to produce leather.

The Waltrading SA tannery stands on the lagoon's banks. "We will do the analysis (of water samples taken) and I will pass my report to the Legal Department," Rosa Morel, an inspector with the Ministry of the Environment and Sustainable Development, told local ABC media outlet. "There is a tannery and it is definitely the tannery that pollutes."

Morel said on a previous visit experts found a pipe, presumably from the tannery, dumping untreated waste into the lagoon. She said authorities' main demand is that the company build a treatment plant for the waste. (AP)