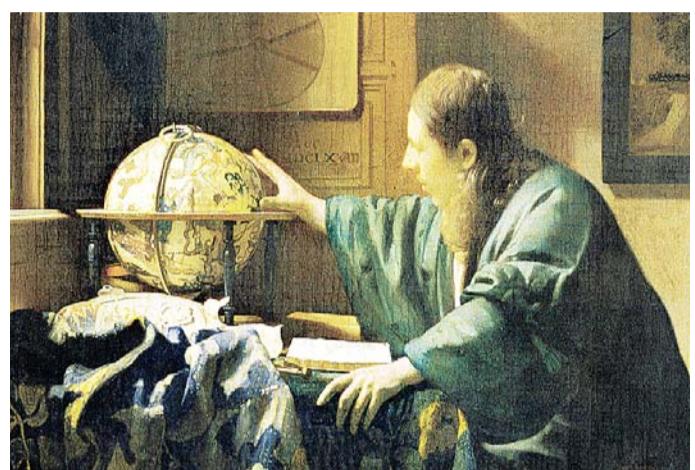


#METEOROLOGY

The Leap Second's Time Is Up

How, and whether, to keep atomic time in sync with Earth's rotation is still up for debate.

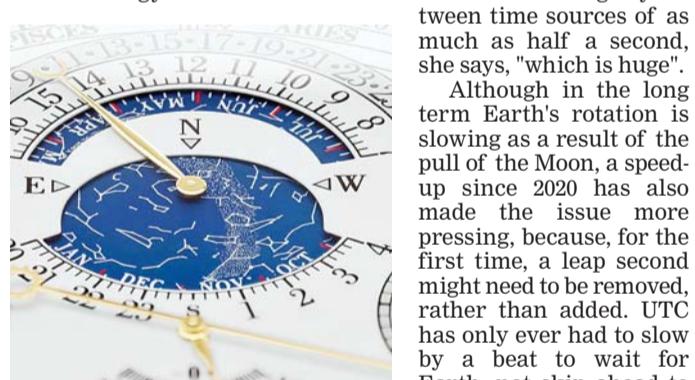


The practice of adding leap seconds to official clocks to keep them in sync with Earth's rotation will be put on hold from 2035, the world's foremost metrology body has decided.

The decision was made by representatives of governments worldwide at the General Conference on Weights and Measures (CGPM) outside Paris on 18 November. It means that from 2035, or possibly earlier, astronomical time (known as UT1), which is determined by Earth's rotation, will be allowed to diverge by more than one second from Coordinated Universal Time (UTC), which is based on the steady tick of atomic clocks.

Since 1972, whenever the two time systems have drifted apart by more than 0.9 seconds, a leap second has been added to UTC.

Stopping the adjustments is "a leap forward" for researchers who work on time and frequency, says Georgette Macdonald, director-general of the Metrology Research Cen-



tre in Halifax, Canada. "I'm pleased their efforts got us to this moment."

Leap seconds aren't predictable, because they depend on Earth's natural rotation. They disrupt systems that are based on precise timekeeping.

Macdonald says, and can wreak havoc in the digital age. Facebook's parent company, Meta, and Google are among the tech companies that have called for leap seconds to be scrapped.

The CGPM - which also oversees the International System of Units (SI) - has proposed that no leap second should be added for at least a century, allowing UT1 and UTC to slide out of sync by about 1 minute.

But it plans to consult with other international organizations and, by 2026, decide on what upper limit, if any, to put on how much the two should be allowed to diverge.

Time For Change

Representatives from Canada, the United States and France were among those at the CGPM who called for the leap second to be scrapped before 2035. But Russia, which voted against the proposal, wants to



Theo with a Komodo dragon in Komodo Islands, Indonesia.



Shailaza Singh
Published author,
poet and a YouTuber

W

#WANDERLUST

If you happen to meet Ellen McGregor Kortan (51) (Ellen) and Theodore Kortan (58) (Theo) at the first glance, this couple would seem like ordinary American tourists. However, when you start talking to them, you realize that they are way different than the other jet-setters, destination-traveling tourists who frequent Rajasthan. They call themselves 'slow travellers' and have been travelling the world on a budget (less than \$200 per month) and been to more than 20 countries across four continents since 2015. They have visited Mexico, Belize, Guatemala in South America, Morocco in North Africa, Portugal, Italy, Spain, United Kingdom, Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece in Europe, Singapore, Malaysia, Vietnam, Thailand, Cambodia, Indonesia, Philippines in South East Asia. Now they are on a tour of India and have visited Mumbai, Jaipur, Ajmer and are planning to visit Chennai, the whole of North East India and more.

This couple has been together for over three decades. When Cupid struck, Theo was a videographer in Channel 5 in USA while Ellen worked there as a producer. When they talked about their dream of world travel, it didn't take them long to realize that they were meant to be together. After marriage, they started planning their retirement and consciously decided not to have children. In Ellen's words, 'We call ourselves Earth Vagabonds' as we love wandering on this planet. We didn't want to retire and relocate to one specific place. Instead, we chose to wander around and see the world. Theo retired at 52 and I retired at 43 in 2015.'

So, where does the money to travel come from? Theo says, 'From a very young age, my dream has been to travel the world. So, I have always lived frugally and well below my means. When Ellen and I started traveling, I started saving her and traveling the world on a budget which became her dream too. We started saving very early. In America, you can ask your employer to save a portion of your salary and put it in a different account, which can then be withdrawn as a lumpsum. We also made a lot of wise investments. Plus, we own a home in Cleveland, Ohio which we have rented out for a modest passive income of \$700 (INR 57,400) per year.'

Ellen says, 'Theo is a very shrewd shopper. Whether in America or foreign countries, he always hunts for the best deals and the lowest prices, which makes saving easy. We often hunt for discounts. We don't buy a lot of clothes. We have a few pairs; we wear them out and then buy new ones. In America, I'm just one car for most of my adult life as compared to other Americans who buy

Everyone dreams of travelling the world after their retirement, however most of us get bogged down by our responsibilities, work and daily duties. But Ellen and Theo had made up their mind years ago. They decided to spend their lives travelling the world but on a budget!

Traveller Not a Tourist... (...1)



Theo in Guatemala.



Theo in Venice, Italy

a new car every two or three years. Moreover, we don't spend a lot of money on five-star hotels or ordering food. Instead, we rent Airbnbs everywhere we go. We don't use airplanes where we can opt for trains or buses or cars. We have our own kitchen where we cook our own food, shop at the local market and live like the locals. There are times when we have been over charged by the locals but then soon, we make friends with them and they charge us the normal price. For example, just the other day, I went shopping for coconut water. I found a shop some blocks away from my Airbnb. The first day, the guy charged me 80 INR. The next day when I went again and started talking to him, he took just 40 bucks for

a coconut water. In fact, he even invited me to visit his home and I met his family!'

Theo agrees. The one thing that we have realized in slow travel is that people are almost the same everywhere. No one is really bothered about politics or religion or caste and creed. All they really want to do is live a good life and raise their children well.'

So, what has been their traveling experience like? 'Oh! It's been an amazing experience,' says Ellen. 'We have walked the Sahara Desert, we swam with the whale sharks in La Paz in Mexico, we have hiked overnight to see the active Fuego volcano in Guatemala. We also lived with the elephants for eight nights and eight days in Thom



Ellen and Theo at Parthenon Temple in Athens, Greece.



Acatenango Volcano in Guatemala.

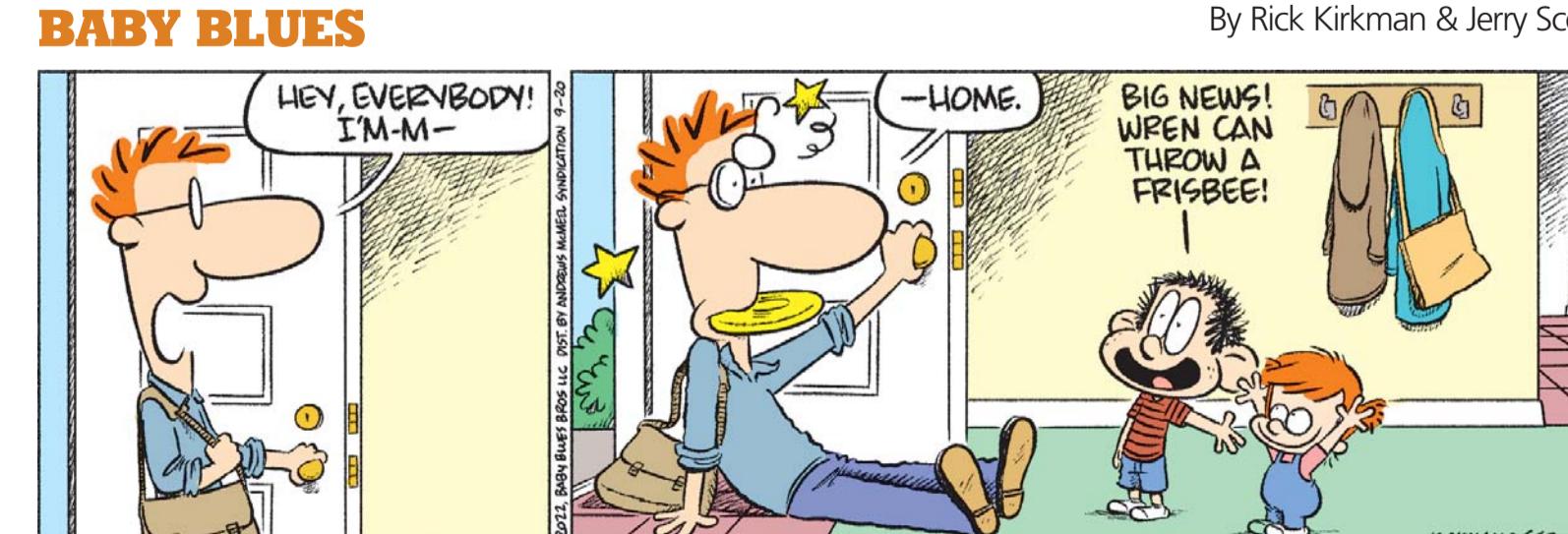


Ellen after the hike to Acatenango Volcano with her two guides.



Algeria Sahara Desert.

By Rick Kirkman & Jerry Scott



ZITS



JEREMY, IT'S SIX-THIRTY!

TIME TO GET UP!



THERE CAN'T BE A JEREMY WITHIN A FIVE-MILE RADIUS, WHO ISN'T.

International Systems Engineer Day

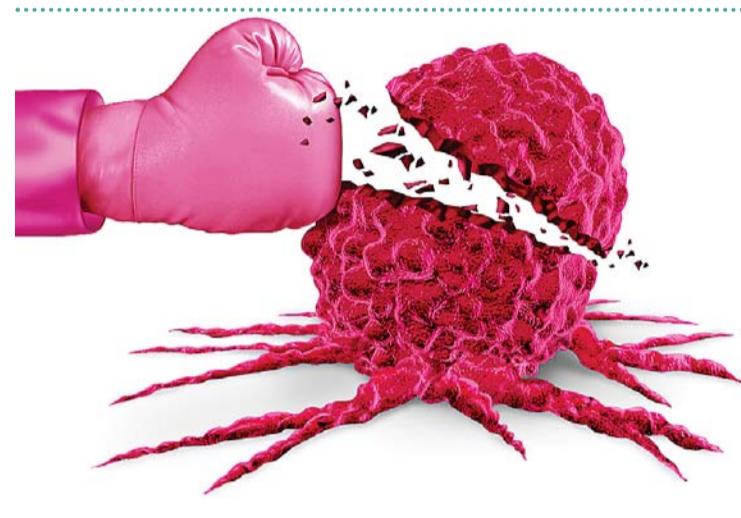


With the world becoming more and more digitized every day, there is a group of people that has rather suddenly become one of the most important groups of people in the world: systems engineers. Systems engineers work on numerous complex projects: spacecraft design, computer chip design, robotics, software integration, and bridge-building. The computer you're using right now would not exist if it weren't for systems engineers, nor would the plane you're taking to go to your exotic holiday destination, and nor would the bridge you need to cross to get to work every day.

#PATHOLOGY

Fight Against Cancer

Memo1, by binding copper when needed, protects the cancer cells so that they can continue to live and spread.



or cancer cells to grow and spread around the human body, they need proteins that bind copper ions. It's this form of copper ions that is most common in living cells. It's an important discovery because reduced copper, while it is needed in the body, also contributes to redox-reactions that damage - or even kill - the cells. The researchers found that when Memo1 interacted with copper, the metal's toxic redox reactions were blocked.

"This poses a risk for the tumour to be dependent on a lot of copper because it can provoke chemical reactions that are harmful to the cancer cells. We believe that Memo1, by binding copper when needed, protects the cancer cells so that they can continue to live and spread," says Pernilla Wittung-Stafshede, who is one of the study's lead authors.

The researchers also saw that Memo1 can form a complex with another copper-binding protein found in our cells - Atox1. It is a copper transporter inside human cells and the research team has previously shown that Atox1, with the help of copper, contributes to breast cancer cells being able to move and form metastases.

"Therefore, these proteins are highly important to study when it comes to understanding the development of cancer and deeper knowledge about them can lead to new targets for treatment of the disease," says Pernilla Wittung-Stafshede, Professor of Chemical Biology at Chalmers University of Technology, Sweden.

Most cancer-related deaths are due to the fact that metastases - secondary tumours - form in several places in the body, for example, in the liver or lungs. A protein called Memo1 is part of the signalling systems that cancer cells use to grow and spread around the body. Previous research has shown that when the gene for Memo1 is inactivated in breast cancer cells, their ability to form metastases decreases.

A research group from Chalmers planned to take a closer look at the connection between Memo1 and Atox1. In a new study published in the scientific journal PNAS, the researchers examined the Memo1 protein's ability to bind copper ions through a series of test tube experiments. They discovered

that the protein binds copper but only the reduced form of copper.

It is this form of copper ions that is most common in living cells. It's an important discovery because reduced copper, while it is needed in the body, also contributes to redox-reactions that damage - or even kill - the cells.

The researchers found that when Memo1 interacted with copper, the metal's toxic redox reactions were blocked.

"This poses a risk for the tumour to be dependent on a lot of copper because it can provoke chemical reactions that are harmful to the cancer cells. We believe that Memo1, by binding copper when needed, protects the cancer cells so that they can continue to live and spread," says Pernilla Wittung-Stafshede, who is one of the study's lead authors.

The researchers now want to move forward with determining the copper ion binding sites in Memo1, and how the presence of copper affects Memo1's activities in cancer development.



By Jerry Scott & Jim Borgman

