



SPARC WEEKLY



FOUR GLOBAL POLICIES COULD ELIMINATE MORE THAN 90% OF PLASTIC WASTE AND 30% OF LINKED CARBON EMISSIONS BY 2050



Plastic production and plastic pollution negatively affect our environment

A new study released in Science today determines that just four policies can reduce mismanaged plastic waste by 91% and plastic-related greenhouse gasses by one-third. The policies are: mandate new products be made with 40% post-consumer recycled plastic; cap new plastic production at 2020 levels; invest significantly in plastic waste management -- such as landfills and waste collection services; and implement a small fee on plastic packaging. This policy package also delivers climate benefits, reducing emissions equivalent to taking 300 million gasoline-powered vehicles off the road for one year.

The study, "*Pathways to reduce global plastic waste mismanagement and greenhouse gas emissions by 2050*," by researchers at the University of California Berkeley and the University of California Santa Barbara, comes in advance of negotiations in Busan, Republic of Korea (November 25-December 1), where delegates from more than 190 countries are expected to iron out the final details of the world's first legally binding treaty on plastic pollution.

"This is it. These upcoming negotiations in Busan are our one chance to come together as a planet and fix this problem," said Dr. Douglas McCauley, Professor at UC Santa Barbara, Adjunct Professor at UC Berkeley. "One of the most exciting discoveries in this research is that it is actually possible to nearly end plastic pollution with this Treaty. I'm cautiously optimistic, but we can't squander this once-in-a-lifetime opportunity."

If no action is taken in Busan, annual plastic consumption will rise 37% between 2020 and 2050, and plastic pollution will nearly double across the same period.

<https://www.science.org/doi/10.1126/science.adr3837>

<https://www.sciencedaily.com/releases/2024/11/241114161138.htm>

THE WORLD'S LARGEST CORAL WAS DISCOVERED IN THE SOUTH PACIFIC



The behemoth coral is longer than a blue whale and older than the United States.

Off the coast of the Solomon Islands lurks a centuries-old being that is so immense, it can be seen from space.

Discovered in October by the National Geographic Society's Pristine Seas team, it is the world's largest standalone coral. Coming in at roughly 34 meters wide, 32 meters long and 6 meters tall, the behemoth coral is longer than the average blue whale. It also dwarfs the world's next largest-known coral, a 22-meter-wide coral in American Samoa known as Big Momma.

"While Big Momma looked like a huge scoop of ice cream plopped down on the reef, this newly discovered coral is as if the ice cream started to melt, spreading forever along the seafloor," said Molly Timmers, a marine ecologist on the Pristine Seas team.

The immense specimen is a shoulder-blade coral — so named for the scapula-like ridges that comprise its body — called *Pavona clavus*. The team estimates that it was constructed by nearly a billion stony coral polyps, tiny creatures that live together and build rigid skeletons made of calcium carbonate.

Such living structures provide crucial habitat for many marine species, said coral scientist Eric Brown of the Pristine Seas team, during a news conference. "Coral reef ecosystems comprise only about 0.2 percent of the ocean's area, yet they contain over 25 percent of the marine species on the planet."

After measuring the coral's record-breaking dimensions and reviewing studies of the species' growth rate, the team estimated that it was 300 to 500 years old. That longevity could be a boon to researchers, as the composition of a coral skeleton records information about its environmental conditions.

While the newfound coral appears healthy, coral reefs around the world face many threats, from ocean acidification to pollution to coral bleaching. According to Brown, the discovery is a reminder that "it's important for us to do whatever we can to protect these environments that are both small, yet mighty."

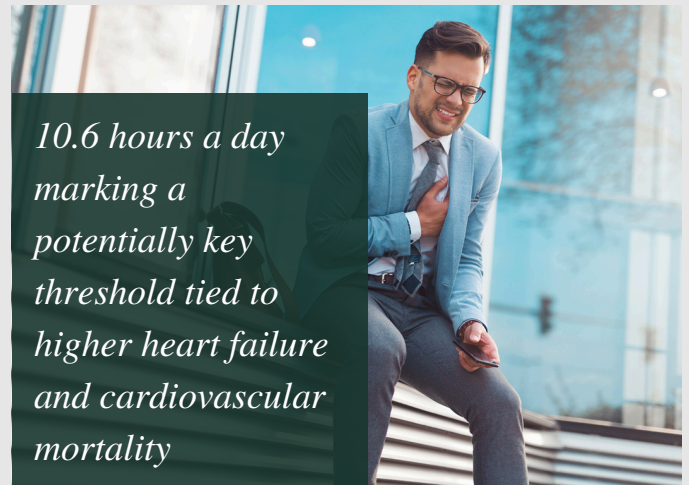
<https://www.sciencenews.org/article/world-largest-coral-solomon-islands>

SITTING TOO LONG CAN HARM HEART HEALTH, EVEN FOR ACTIVE PEOPLE

Approximately 10 hours or more of sedentary behavior per day is associated with heightened risk of heart failure and cardiovascular death, even in those who regularly exercise.

More time spent sitting, reclining or lying down during the day may increase the risk of cardiovascular disease (CVD) and death, according to a study in *JACC*, the flagship journal of the American College of Cardiology, and presented at the American Heart Association's Scientific Sessions 2024. More than roughly 10-and-a-half hours of sedentary behavior per day was significantly linked with future heart failure (HF) and cardiovascular (CV) death, even among people meeting recommended levels of exercise.

Insufficient exercise is a known risk factor for cardiovascular disease (CVD). Over 150 minutes of moderate-to-vigorous physical activity per week is recommended by current guidelines to promote heart health. However, study experts say exercise is only a small fraction of overall daily activity, and the current guidelines don't provide specific guidance on sedentary behavior which accounts for a much larger portion of daily activity, despite evidence that it's directly linked with CVD risk.



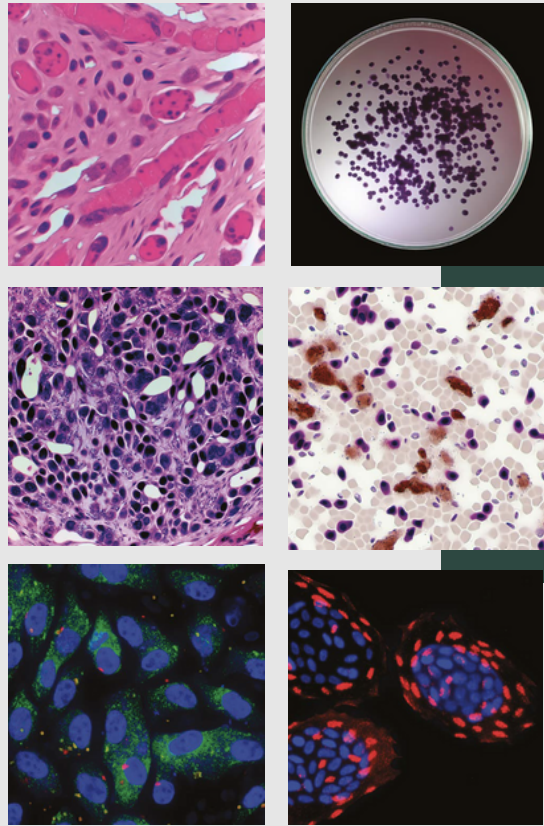
This study examined the amount of sedentary time at which CVD risk is greatest and explored how sedentary behavior and physical activity together impact the chances of atrial fibrillation (AF), heart failure (HF), myocardial infarction (MI) and CV mortality.

Among the 89,530 study participants of the UK biobank, the average age was 62 years and 56.4% were women. Participants submitted data from a wrist-worn triaxial accelerometer that captured movement over seven days. The average sedentary time per day was 9.4 hours. After an average follow-up of eight years, 3,638 individuals (4.9%) developed incident AF, 1,854 (2.1%) developed incident HF, 1,610 (1.84%) developed indecent MI and 846 (0.94%) died of CV causes, respectively.

"Future guidelines and public health efforts should stress the importance of cutting down on sedentary time," Khurshid said. "Avoiding more than 10.6 hours per day may be a realistic minimal target for better heart health."

<https://www.sciencedaily.com/releases/2024/11/241115124729.htm>
<https://www.sciencedirect.com/science/article/abs/pii/S0735109724099200?via%3Dihub>

AI-GENERATED IMAGES THREATEN SCIENCE



All of these images were generated by artificial intelligence.

From scientists manipulating figures to the mass production of fake papers by paper mills, problematic manuscripts have long plagued the scholarly literature. Science sleuths work tirelessly to uncover this misconduct to correct the scientific record. But their job is becoming harder, owing to the introduction of a powerful new tool for fraudsters: generative artificial intelligence (AI).

“Generative AI is evolving very fast,” says Jana Christopher, an image-integrity analyst at FEBS Press in Heidelberg, Germany. “The people that work in my field — image integrity and publication ethics — are getting increasingly worried about the possibilities that it offers.”

The ease with which generative-AI tools can create text, images and data raises fears of an increasingly untrustworthy scientific literature awash with fake figures, manuscripts and conclusions that are difficult for humans to spot. Already, an arms race is emerging as integrity specialists, publishers and technology companies race to develop AI tools that can assist in rapidly detecting deceptive, AI-generated elements of papers.

“It’s a scary development,” Christopher says. “But there are also clever people and good structural changes that are being suggested.”

Pinpointing AI-produced images poses a huge challenge: they are often almost impossible to distinguish from real ones, at least with the naked eye. “We get the feeling that we encounter AI-generated images every day,” Christopher says. “But as long as you can’t prove it, there’s really very little you can do.” There are some clear instances of generative-AI use in scientific images, such as the now-infamous figure of a rat with absurdly large genitalia and nonsensical labels, created using the image tool Midjourney. The graphic, published by a journal in February, sparked a social-media storm and was retracted days later. Most cases aren’t so obvious. Figures fabricated with Adobe Photoshop or similar tools before the rise of generative-AI — especially in molecular and cell biology — often contain telltale signs that sleuths can spot, such as identical backgrounds or an unusual absence of smears or stains.

WHO ARE WE?

SPARC Robotics Team's mission and vision is to make our environment the best it can be. On a volunteer basis, we look at the problems that are happening around us and make them our problems, both as SPARC and individually, and help as much as we can with appropriate projects. NASA ACCP (Astro Camp Community Partners) was only in the US until four years ago. This year they came to Turkey with us after four years of traveling to many countries. ACCP educates school-age children from kindergarten to high school on science-related topics of interest with practical knowledge and application, while also supporting children's craft development, general culture and questioning skills. As SPARC, we have brought this training provided by NASA to our country in the most comprehensive way and our continuous communication with NASA not only enables us to improve our trainings day by day, but also gives us the opportunity to learn about the innovations in the field of STEM instantly, from the most accurate source and to spread the knowledge we have around us.



EDITOR

Hello, I'm Defne Şehidoğlu and I am the editor of this newsletter this week. Me and my dear friend Defne Ulu will be working together for future news. I hope you find it useful and I hope it has helped you to keep your mind out of your problems while reading it. Have a good week. See you next week!!