

# Bulletin Board

## Contents

SEP. 25, 2020

(click on page numbers for links)

### REGULATORY UPDATE

#### ASIA PACIFIC

AVPMA stakeholder engagement framework .....	4
The Workplace exposure standard (WES) for respirable crystalline silica (silica dust) has recently halved .....	4

#### AMERICA

NC getting tougher on PFAS polluters, but researchers say more action is needed .....	5
After the blazes: Poisoned water and 'a flood on steroids' .....	6
CARB approves first emissions reduction plans for three Southern California communities .....	8
How can your air quality be 'moderate' when sky is grimy orange? .....	9

#### EUROPE

Should the fashion industry ban PFAS .....	9
Disinfection of telephone receivers? New Covid-19 occupational safety rules published by German labour authorities.....	11

### REACH UPDATE

Looming EU decision threatens cobalt supply chain.....	13
UK REACH chemicals registration deadline extended .....	13

### JANET'S CORNER

Driver's license.....	15
-----------------------	----

### HAZARD ALERT

Sodium Hydroxide .....	16
------------------------	----

### GOSSIP

'Lost decade for nature': UK accused of missing majority of UN biodiversity targets.....	19
No plastic bags, straws, or hotel shampoo bottles by 2025 as China embarks on journey to reduce and replace polluting material.....	21

## CONTACT US

subscribers@chemwatch.  
net  
tel +61 3 9572 4700  
fax +61 3 9572 4777

1227 Glen Huntly Rd  
Glen Huntly  
Victoria 3163 Australia

**\* While Chemwatch has taken all efforts to ensure the accuracy of information in this publication, it is not intended to be comprehensive or to render advice. Websites rendered are subject to change.**

# Bulletin Board

## Contents

SEP. 25, 2020

The best news of 2020? Humanity may never hit the 10 billion mark.....	25
A sobering breakdown of severe COVID-19 cases shows young adults can't dismiss it .....	28
Half a million cases of COVID-19 diagnosed in US children.....	29
Chemists turning bricks into energy storing devices.....	31
South Australia's ban on single-use plastic cutlery and straws hailed as 'historic' .....	31
Possible hint of life discovered on Venus.....	34
Ethical or exploitative—should prisoners participate in COVID-19 vaccine trials?.....	35
This moth may outsmart smog by learning to like pollution-altered aromas.....	40

## CURIOSITIES

Is coconut oil healthy? .....	42
Digital wind: high-powered computing helps scientists grasp airflows at offshore wind farms.....	44
How does cannabis get you high? .....	46
Biocoating boosts bacterial viability for wastewater treatment.....	50
Alien-hunting telescope suffered 'no damage to electronics' during mysterious midnight disaster .....	51
Multitasking algae treat wastewater, produce biofuel.....	52
The surprising dangers of cooking and cleaning .....	53
Iron catalysts covered in carbon graphene layer could inexpensively produce biofuels.....	57
The evolution of risk.....	58
Why can't humans digest corn? .....	59

## TECHNICAL NOTES

(Note: Open your Web Browser and click on Heading to link to section) ...	61
CHEMICAL EFFECTS .....	61
ENVIRONMENTAL RESEARCH .....	61
OCCUPATIONAL.....	61
PHARMACEUTICAL/TOXICOLOGY .....	61

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

### ASIA PACIFIC

#### AVPMA stakeholder engagement framework

2020-09-04

We've published our [Stakeholder Engagement Framework](#), which sets out the Australian Pesticides and Veterinary Medicines Authority's (APVMA) strategic approach to stakeholder consultation and collaboration for the 2020–23 period.

The Framework is intended to support the APVMA to achieve our corporate strategies and guide our important work with stakeholders.

An accompanying document, [APVMA Stakeholder Engagement Activities](#), outlines the events and activities we intend to undertake throughout 2020–21 and will be reviewed annually.

The Framework was recently endorsed by the [APVMA Consultative Forum](#), and incorporates feedback received from public consultation, which was held over the period 19 December 2019 to 21 February 2020.

Enquiries about the APVMA's Stakeholder Engagement Framework and Activities can be directed to [enquiries@apvma.gov.au](mailto:enquiries@apvma.gov.au).

For more [news and updates](#) from the Australian Pesticides and Veterinary Medicines Authority (APVMA), visit our website.

APVMA, 4 September 2020

<https://apvma.us2.list-manage.com/track/click?u=f09f7f9ed2a2867a19b99e2e4&id=1c5fd0992a&e=284f7b92d5>

#### The Workplace exposure standard (WES) for respirable crystalline silica (silica dust) has recently halved

2020-09-17

The workplace exposure standard (WES) for respirable crystalline silica (silica dust) has recently halved. If you work with materials like engineered stone, concrete or tiles, use the new silica checklist to see if you need to implement additional control measures in your workplace so that the WES is not exceeded.

Safe Work Australia has published information, including a checklist, to help persons conducting a business or undertaking (for example, an employer or small business owner) to understand the changes to the WES

**The Framework is intended to support the APVMA to achieve our corporate strategies and guide our important work with stakeholders.**

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

for silica dust, and to assess and effectively manage the risks of silica dust in their workplace.

The WES for silica dust has halved from an eight-hour time weighted average of 0.1 mg/m<sup>3</sup> to 0.05 mg/m<sup>3</sup>. The reduced silica dust WES was **implemented in most jurisdictions** from 1 July 2020.

Learn more about the **changes to the WES for silica dust** and use the **workplace checklist** to manage changes to the WES for silica dust at your workplace.

The national guide **Working with silica and silica containing products** explains what you must do to keep your workers safe from the risks of silica dust. This guide has been **translated into six languages** for those who speak a language other than English.

Safe Work Australia, 17 September 2020

<https://www.safeworkaustralia.gov.au/changes-workplace-exposure-standard-respirable-crystalline-silica>

## AMERICA

### NC getting tougher on PFAS polluters, but researchers say more action is needed

2020-09-09

North Carolina is getting tougher on industries that pollute the state's air and waterways with potentially carcinogenic per- and polyfluoroalkyl compounds, commonly known as PFAS or "forever chemicals."

On Aug. 10, state Attorney General Josh Stein announced that he is starting an investigation into manufacturers and others that have fouled the state's lakes, rivers and streams with PFAS.

Stein's office declined to reveal what the investigation will entail, but it later confirmed that Stein has partnered with the national environmental law firm [Kelley Drye & Warren](#). The firm, based in New York with offices in seven other states, says on its website that it is involved in more than 20 PFAS lawsuits across the country.

Three days after Stein's announcement, the state Department of Environmental Quality, along with Cape Fear River Watch and the Southern Environmental Law Center, said it plans to take significant

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

additional action against Chemours to compel the company to rid PFAS from the groundwater at the chemical company's plant along the banks of the Cape Fear River in Bladen County.

### Enforceable standards needed

While researchers, environmental activists and some state lawmakers applaud those actions, they say the efforts don't go far enough to protect hundreds of thousands of North Carolinians from drinking tap water that has been contaminated by GenX and other PFAS.

What is needed at a minimum, they say, are enforceable statewide PFAS drinking water standards — known as maximum contaminant levels or MCLs — that would trigger a requirement forcing municipal water utilities to meet the new regulations.

### Full Article

North Carolina Health News, 9 September 2020

<https://www.northcarolinahealthnews.org/2020/09/09/nc-getting-tougher-on-pfas-polluters-but-researchers-say-more-action-is-needed/>

### After the blazes: Poisoned water and 'a flood on steroids'

2020-09-11

Historic wildfires raging from California to Colorado are weakening watersheds and setting the stage for deadly mudslides and flooding and, in some places, threatening to poison critical water supplies.

Fueled by record-setting temperatures and strong winds, blazes are wreaking havoc in the West, decimating entire towns like Malden in eastern Washington state, where 80% of the homes and structures — from the fire station to city hall — were burned to the ground.

But the fires don't just pose a threat to things that burn. More intense and larger fires are also shifting the very ground in Western states. Severe wildfires can change the hydrologic response of a watershed so quickly that even a relatively modest rainstorm can trigger flash floods and steep terrain debris flows, said Jason Kean, a research hydrologist with the U.S. Geological Survey's Landslide Hazards Program in Golden, Colo.

**"A debris flow is kind of like a flood on steroids," said Kean. "It's all bulked up with rocks, mud, boulders, and then it becomes a different animal that can be even more destructive than a flood!"**

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

“A debris flow is kind of like a flood on steroids,” said Kean. “It’s all bulked up with rocks, mud, boulders, and then it becomes a different animal that can be even more destructive than a flood.”

Burned and denuded land no longer has the vegetative root structure to help stabilize the soil and is easily eroded by rain, Kean said, adding that the land also can’t absorb water the way it did before the fire. High-severity fires can also cause soil surfaces to harden or even cause soil to repel water, Kean said.

It’s a scenario that’s played out more and more as the size and intensity of fires grow in a warming world.

In December of 2017, one of the largest fires in California — the massive Thomas wildfire — burned through large swaths of Santa Barbara and Ventura counties. In January, before the fire was contained, intense bursts of rain fell on a portion of the burn area above the city of Montecito, Calif., weakening the watershed there. A massive slew of boulders and debris overwhelmed the town without warning, killing 23 people and destroying more than 400 homes in its path.

Another lesser-known threat to the region’s water is gaining attention in urban areas affected by wildfires: chemical contamination.

In cities that have experienced devastating fires, water officials are finding cancer-causing benzene and other volatile organic compounds in contaminated and fire-damaged water infrastructure.

Such was the case in the Northern California town of Santa Rosa after the Tubbs Fire in the fall of 2017 and again in the town of Paradise after the deadly 2018 Camp Fire. Earlier this week, the carcinogen was **detected** in the Riverside Grove neighborhood near Boulder Creek, Calif., a community devastated by the CZU August Lightning Complex fires.

Andrew Whelton, an associate professor of civil, environmental and ecological engineering at Purdue University, said such contamination is gaining more attention — and scrutiny — given the lack of water testing after wildfires.

[Full Article](#)

E&E News, 11 September 2020

<https://www.eenews.net/stories/1063713491>

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

### CARB approves first emissions reduction plans for three Southern California communities

2020-09-12

The California Air Resources Board has approved the first three Community Emissions Reduction Programs (CERP) within the South Coast Air Quality Management District (SCAQMD) under Assembly Bill 617.

Residents living in the three communities are heavily impacted from high levels of air pollution sources including ports and inland warehouses traffic. The plans were developed under the requirements of AB 617, requiring community-driven action to identify, to monitor and to reduce air pollutants of specific concern to each of community. The plans approved are for:

- **Wilmington, Carson, West Long Beach.** Some of the key strengths for the Wilmington, Carson, West Long Beach CERP are the rules for flaring and equipment used at refineries, fence-line monitoring at refineries and incentives for port-related equipment. Other recommended actions to strengthen implementation identified for the Air District, CARB, and steering committee to work together are to prioritize strategies and utilize enforcement feedback.
- **East Los Angeles, Boyle Heights, West Commerce.** The East Los Angeles, Boyle Heights, West Commerce Community CERP will focus on a railyard Indirect Source Rule (ISR, a local regulation used to control or reduce emissions associated with new and existing indirect sources), use new technologies to help target incentives and enhanced enforcement for trucks.
- **San Bernardino, Muscoy.** Focus on a warehouse Indirect Source Rule, air monitoring at concrete batch and asphalt plants and air filtration at schools are a key strength of the San Bernardino, Muscoy Community CERP. It will also conduct quarterly idling sweeps for neighborhood truck traffic.

The community emissions reduction programs were developed through a partnership between the South Coast Air Quality Management District and community steering committees for each of the three communities, which include community residents, local businesses, air district representatives and other stakeholders to develop the specific emission reduction strategies included in each of the programs.

**Residents living in the three communities are heavily impacted from high levels of air pollution sources including ports and inland warehouses traffic.**

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

### Full Article

Green Car Congress, 12 September 2020

<https://www.greencarcongress.com/2020/09/20200912-carb.html>

### How can your air quality be 'moderate' when sky is grimy orange?

2020-09-11

If the smoke and ash you're seeing when you look outside belie the official air quality index for your area, the explanation at least in part is that the network of detectors was not designed for tracking all the pollution from distant but massive wildfires.

Much of the grimy orange tainting the skies above the Metro LA area is caused by smoke from the major fires hundreds of miles away in northern California, said Philip Fine, the deputy executive officer for the South Coast Air Quality Management District.

"The fortunate thing is a lot of that smoke is high in the atmosphere, and we are not breathing it directly," Fine said. As a result, it is also not detected by ground level sensors.

### Full Article

NBC Los Angeles, 11 September 2020

<https://www.nbclosangeles.com/news/local/how-can-your-air-quality-be-moderate-when-sky-is-grimy-orange/2427086/>

## EUROPE

### Should the fashion industry ban PFAS

2020-09-10

Is your favourite raincoat, hiking boots or period underwear causing you more harm than good?

When we get dressed in the morning, we usually don't think about what chemicals are lurking in our clothing. But there's a potentially harmful group of chemicals present in everything we use daily - from our waterproof jackets to our food wrappers and non-stick frying pans, namely PFAS.

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

Short for per- and poly-fluoroalkyl substances, PFAS are a large group of synthetic chemicals which contain carbon-fluorine bonds, some the strongest chemical bonds found in organic chemistry. And just like Covid-19, they have been spreading at an alarming rate. They're found in everything from our drinking water to our soil, our food and even our blood. PFAS are so widespread that an international group of scientists backed by the REACH Regulation (which aims to protect consumers and the environment through early and improved identification of chemicals) are calling for a restriction proposal of the production and use of all PFAS in the EU.

PFAS: the fashion industry's 'dirty' secret

However, getting rid of PFAS is much easier said than done. This group of some 5,000 chemicals is used by a number of industries from food to fashion, cosmetics and agriculture. Invented in the 1950s, PFAS are blended into a variety of materials and textiles to create a protective sealant or resistant layer. Incredibly durable, they are used by outdoor and apparel brands to ensure that your jacket keeps you dry, and your shoes do not get dirty. Brands ranging from The North Face to Patagonia and Wolverine use PFAS in their Durable Water Repellent (DWR) treatment to prevent surface saturation on their outdoor apparel and footwear.

However, because PFAS are so long-lasting, they resist degradation and accumulate with time. A single carbon-fluorine bond is so strong it cannot simply be pulled apart - it's like sticking two Lego blocks together with superglue. "Once PFAS are emitted, either during production, product use or disposal, it is very difficult to remove them from the environment," explains Steffen Schellenberger, PhD Materials and Production Researcher at RISE (Research Institutes of Sweden) to FashionUnited. "Since they have spread across the whole planet, you can find them everywhere - even in very remote regions."

'Forever chemicals' in everything from your raincoat to your blood

Levels of PFAS have been found in groundwater and soil around the world, from the US to the UK and the Netherlands, earning them the nickname 'forever chemicals'. What's more, PFAS are believed to be found in the bloodstreams of nearly every living being on the planet. Where scientists have tested for the presence of PFAS they've found it - in the blood or vital organs of everything from humans, to salmon and Alaskan polar bears. In the past, studies have shown that several of the longer-chain PFAS, known as perfluorooctanoic acid (PFOA), can act as Endocrine-disrupting compounds and interfere with the natural hormones in our bodies,

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

causing a range of health issues such as type two diabetes, immune disorders and poor cardiovascular health.

### Full Article

Fashion United UK, 10 September 2020

<https://fashionunited.uk/news/business/should-the-fashion-industry-ban-pfas/2020091050834>

### **Disinfection of telephone receivers? New Covid-19 occupational safety rules published by German labour authorities**

2020-09-14

*On 10 August 2020, Germany's Federal Ministry of Labour and Social Affairs ('BMAS') announced a new Covid-19 occupational health and safety rule. The new rule supplements the Covid-19 occupational health and safety standard that was previously published in April.*

The purpose of the new occupational health and safety rule is to provide employers with a 'state of the art': if employers implement the technical, organisational and personal measures proposed in this rule, they can assume that they are acting in a legally compliant manner.

#### **Content of the new occupational health and safety rule**

The new BMAS rule is 23 pages long and is divided into a general and a special section. The first, general part describes the scope of application of the rule and provides definitions. It also points out employers' obligation to review their existing risk assessment and occupational health and safety measures against the background of the epidemic and the BMAS health and safety standard published in April, and to update them if necessary.

*The general section also includes fourteen protective measures described in detail, including the following:*

- The new rule continues to refer to the minimum distance of 1.5 meters between persons. This distance can be maintained by modifying the furniture, including partitions, and by using other suitable rooms. In this context it is interesting to note that so-called 'short-term contacts' are excluded from this. In the definitions, a short-term contact is described as a face-to-face contact between two persons, which lasts less than 15 minutes in total. According to the current state of knowledge and the latest information provided by the Robert

# Bulletin Board

## Regulatory Update

SEP. 25, 2020

Koch Institute, such short-term contacts present only minor risks of infection.

### Full Article

Ius Laboris, 14 September 2020

<https://theword.iuslaboris.com/hrlaw/insights/disinfection-of-telephone-receivers-new-covid-19-occupational-safety-rules-published-by-german-labour-authorities>

**The new BMAS rule is 23 pages long and is divided into a general and a special section.**

# Bulletin Board

## REACH Update

SEP. 25, 2020

### Looming EU decision threatens cobalt supply chain

2020-09-11

New regulations on cobalt salts threaten to undermine the EU's push for an independent battery supply chain.

The regulations, proposed by the European Chemicals Agency (ECHA), would require companies handling cobalt salts to pay for the registration and use of the chemicals under REACH regulations and implement stringent safety measures to protect employees against exposure because of cancer risks. The salts include cobalt sulphate, cobalt dinitrate, cobalt dichloride, cobalt carbonate and cobalt di(acetate).

The ECHA Socio-economic Analysis Committee (SEAC) is meeting from 7-18 September to decide whether to proceed with the recommendations. They are widely expected to accept the scientists' advice. It would then be up to the European Commission to decide whether to implement them, with October the likely date for a final decision. Any regulations would have an 18-24 month implementation period.

While not amounting to a ban on the products, market participants warned that it could exclude all but the largest companies — such as Umicore and BASF — from handling cobalt chemicals and undermine Europe's efforts to establish a battery supply chain, because the high costs involved would exclude smaller players and discourage investment.

#### Full Article

Argus Media, 11 September 2020

<https://www.argusmedia.com/en/news/2140584-looming-eu-decision-threatens-cobalt-supply-chain>

### UK REACH chemicals registration deadline extended

2020-09-09

THE UK Government has extended the deadline for UK chemicals companies to register their products with the new system that will come into place following the Brexit transition period. Companies will now have up to six years to complete registrations, up from two years.

UK REACH will come into force from 1 January, replacing the EU REACH system after the Government confirmed in June that it would not be aligning with the European system. Forming a UK version of REACH, rather than seeking associate membership of the European Chemicals

# Bulletin Board

## REACH Update

SEP. 25, 2020

Agency (ECHA), will require some UK chemicals companies to reregister chemicals. Companies do not always have access to the data they need to register chemicals, and the original deadline of two years to register was considered by the industry to be too short.

The UK Government has now announced that it will be extending the time for companies to register with UK REACH to up to six years. Under the new guidance for registrations, new registrations must take place within two, four, or six years depending on the tonnage and how hazardous the chemical is.

#### Full Article

Chemical Engineer, 9 September 2020

<https://www.thechemicalengineer.com/news/uk-reach-chemicals-registration-deadline-extended/>

**The salts include cobalt sulphate, cobalt dinitrate, cobalt dichloride, cobalt carbonate and cobalt di(acetate).**

## Bulletin Board

## Janet's Corner

SEP. 25, 2020

## Driver's license

2020-09-25



<https://www.pinterest.com.au/pin/319263061065119429/>

## Bulletin Board

## Hazard Alert

SEP. 25, 2020

## Sodium Hydroxide

2020-09-18

Sodium hydroxide, aka lye and caustic soda, is an alkaline chemical known for its causticity. It is a co-product of chlorine, and in its raw form, it can be found in flakes, crystals or chips. Its chemical formula is NaOH. [1,2,3]

## USES [2]

Sodium hydroxide is used across a range of applications in various industries. It is used in soap-making and other cleaning products and disinfectants. Sodium hydroxide is used in a variety of pharmaceutical products, and in the energy industry, it is used in fuel cell production. The chemical is also used in the water and food industries for various applications, including water treatments and curing, respectively. Sodium hydroxide is used in the textile industry and in the treatment of wood and paper products.

## ROUTES OF EXPOSURE [4,5]

- The main routes of exposure to sodium hydroxide are skin and eye contact.
- People can also be exposed to sodium hydroxide dust through inhalation.
- Higher levels of sodium hydroxide in the air are found nearer the ground. This means that children are potentially more likely to be exposed to higher rates than adults because they are closer to the higher source.

## HEALTH EFFECTS

Sodium hydroxide poisoning affects a range of systems, including the integumentary and respiratory systems.

## Acute Effects [4]

Severity of symptoms depend on the level and type of exposure.

Acute exposure from skin contact to the chemical can result in red, burning, blistering and painful skin, which can lead to permanent scarring. Burns from the chemical may not be immediately painful; the onset of pain could be delayed. Acute eye contact to sodium hydroxide can result in swelling, pain, blurred vision and redness in the eye. It can also cause

**Sodium hydroxide, aka lye and caustic soda, is an alkaline chemical known for its causticity.**

# Bulletin Board

## Hazard Alert

SEP. 25, 2020

permanent blindness. If the chemical is ingested, it can cause nausea, vomiting, diarrhoea, stomach cramps and death.

### **Chronic Effects [4,6]**

Chronic exposure to sodium hydroxide is toxic to multiple body systems. Long term exposure to the chemical can cause dermatitis, erosion of the teeth, and inflammatory and ulcerative changes in the mouth. It can also result in long-term breathing difficulties; repeated exposure to high dust concentrations could result in changes to lung function. Chronic exposure to the chemical can also result in frequent bouts of bronchial pneumonia, and bronchial irritations with a cough.

### **SAFETY**

#### **First Aid Measures [6]**

- Ingestion: If swallowed, contact a medical professional immediately. DO NOT INDUCED VOMITING. If vomiting occurs, place patient in the recovering position. If the person is conscious (and not showing signs of signs of sleepiness), they are able to have water to rinse out their mouth. They are then allowed to drink it slowly—and as much as they can comfortably drink.
- Skin contact: Remove all contaminated clothing, footwear and accessories. Do not re-wear clothing until it has been thoroughly decontaminated. Immediately rinse affected areas with plenty of water. Contact a doctor immediately.
- Eye contact: Flush eyes (including under the eyelids), with water for at least 15 minutes. Removal of contact lenses should only be done by skilled personnel. Contact a medical professional immediately.
- Inhalation: Take victim away from the contaminated area to the nearest fresh air source and monitor their breathing. Prosthesis that could block the airway, such as false teeth, should be removed. Keep the victim warm. If the victim is not breathing, and you are qualified, you may perform CPR with a one-way valve or protective mask. Immediately contact a medical professional.
- General: Never administer anything by mouth to an unconscious, exposed person.

#### **Exposure Controls/Personal Protection [6]**

- Engineering controls: Emergency eyewash fountains and quick-drench areas should be accessible in the immediate area of the potential

# Bulletin Board

## Hazard Alert

SEP. 25, 2020

exposure. Ensure there is adequate ventilation. Use a local exhaust ventilation or process enclosure, to limit the amount of chemical dust in the air.

- Personal protection: Safety glasses, protective and dustproof clothing, gloves, an apron and an appropriate mask or dusk respirator. Wear impervious shoes. Do not wear contact lenses. For specifications regarding other PPE, Follow the guidelines set in your jurisdiction.

### **REGULATION [7]**

#### **United States:**

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) concentration limit for sodium hydroxide of 2mg/m<sup>3</sup>.

#### **Australia [8]**

Safe Work Australia has set an 8-hour time-weighted average (TWA) for sodium hydroxide of 2mg/m<sup>3</sup> has been set.

### **REFERENCES**

1. <https://www.sydney-solvents.com.au/hydrochloric-acid>
2. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/hydrochloric-acid>
3. <https://pubchem.ncbi.nlm.nih.gov/compound/Hydrochloric-acid>
4. <https://jr.chemwatch.net/chemwatch.web/account/login>
5. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/337689/hpa\\_hydrogen\\_chloride\\_toxicological\\_overview\\_v1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/337689/hpa_hydrogen_chloride_toxicological_overview_v1.pdf)
6. <https://www.cdc.gov/niosh/npg/npgd0332.html>
7. <https://www.chemsupply.com.au/documents/HL0201CH34.pdf>

## Bulletin Board

## Gossip

SEP. 25, 2020

**'Lost decade for nature': UK accused of missing majority of UN biodiversity targets**

2020-09-14

Conservation charity RSPB has warned that the UK has failed to meet the overwhelming majority of international biodiversity targets agreed on 10 years ago in a fresh analysis published ahead of a major UN report card of countries' nature protection efforts.

The group warned on Friday that the UK's "high environmental ambitions" have not led to "real progress" in halting environmental decline over the past decade, slamming the government's assessment of its biodiversity efforts - **submitted last year** - as «overly optimistic».

While the UK government argues that it has failed to meet 14 of the 20 Aichi Biodiversity Targets drawn up by world leaders at the COP10 summit in Japan a decade ago, the RSPB's analysis posits that the UK's performance has been even poorer. The group claims that the country has failed on 17 targets, with progress going backwards in six areas.

The UN's fifth Global Biodiversity Report, set to be published tomorrow, will contain a report card on progress made by countries against the Aichi Biodiversity Targets, non-binding commitments that range from preventing the extinction of threatened species to halving the rate of forest loss.

With global wildlife populations in freefall, the report is expected to be extremely sobering. It follows the latest edition of WWF's **Living Planet Index** last week, which revealed that wildlife populations had fallen 68 per cent since 1970, a decline that the NGO dubbed «catastrophic».

Beccy Sleight, chief executive at the RSPB, stressed that future nature targets must be made legally binding in order to prevent the ongoing loss of wildlife.

"Next year we have the opportunity to play a leading role in developing a new set of global targets to restore nature," she said. "But first we need an honest assessment that recognises we need to do much more at home. We have targets enshrined in law to tackle the climate emergency, but none, yet, to reverse the crisis facing nature. We cannot be in this same position in 2030 with our natural world vanishing due to inaction."

In order to ensure that "the next decade is not again lost to inaction", the group has called on the UK government to boost the amount of land and sea being protected and managed for nature while also allocating more

## Bulletin Board

## Gossip

SEP. 25, 2020

funding for nature conservation. Public funding for the environment dropped nearly 30 per cent from £641m in 2012/2013 to £456m in 2017/2018, according to the report.

A spokesperson from the Department for Environment, Food and Rural Affairs (Defra) emphasised that the government had committed to a green recovery from the coronavirus pandemic and that the UK was first major economy to set a legally binding target for net zero emissions

"We are committed to a greener future, which is why we are leading the world by setting ambitious goals for nature and biodiversity in our landmark Environment Bill as well as introducing new ways to reward farmers for protecting the environment and investing £640m in the Nature for Climate Fund," they said.

The latest news follows the broadcast last night of the latest Sir David Attenborough documentary, titled *Extinction: The Facts*.

Responding to the broadcast, Environmental Audit Committee Chairman, Philip Dunne, said MPs would launch an inquiry this autumn on the UK's failure to deliver on its biodiversity targets.

"From white rhinos to numerous pollinating insects, we are losing species far too quickly and must slam the brakes before even more are lost forever," he said. "Around the world, it has been predicted that we are at risk of losing one million of the world's eight million species, and we must not let this happen. Species up and down the food chain are crucial for biodiversity; crucial for the food we eat and crucial for the oxygen we breathe.

"Sir David's documentary on extinction brings into sharp focus why we must act now before it is too late. Leadership must come from above, and it is deeply concerning that reports suggest the UK could miss 17 of its 20 UN biodiversity targets."

businessgreen.com, 14 September 2020

<https://www.businessgreen.com>

**Of the 63 million tonnes of plastic wastes China produced last year, 30 per cent were recycled, 32 per cent went into landfills, 31 per cent were burnt and 7 per cent were abandoned, according to the China National Resources Recycling Association.**

# Bulletin Board

## Gossip

SEP. 25, 2020

### No plastic bags, straws, or hotel shampoo bottles by 2025 as China embarks on journey to reduce and replace polluting material

2020-09-12

China, the biggest producer of plastic waste on the planet, is poised to kick off

a five-year plan to reduce and replace the pollutant, in an ambitious programme with far-reaching implications on the nation's supply chain, while creating billions of dollars of new business opportunities.

By the year's end, a ban will take effect on the production and sale of disposable foamed plastic tableware, straws and plastic cotton buds. Non-biodegradable plastic bags will go in phases starting this year, expanding nationwide by 2025. Hotels must stop handing out free disposal plastic products, while couriers are instructed to stop using non-biodegradable plastic packaging by 2025.

The drastic action points could not have come sooner, as China's mountain of mismanaged, or inadequately disposed, plastic wastes – projected at 26 per cent of global total by 2025 according to scientific research cited by University of Oxford – have damaged the environment irreparably. Of the 63 million tonnes of plastic wastes China produced last year, 30 per cent were recycled, 32 per cent went into landfills, 31 per cent were burnt and 7 per cent were abandoned, according to the China National Resources Recycling Association.

"Compared to practices in Europe and many other nations, this new policy framework is the most comprehensive in the world and will provide good reference value for other nations," said Zhao Kai, vice-chairman of the China Association of Circular Economy (CACE), a state-backed body that supports the government's resource conservation and environmental protection policy formulation and implementation.

China's journey to cut plastic waste actually began in 2018, when the country that imported half of the world's recyclable plastic refuse banned the practice, forcing waste exporters like Japan and the United States to find new ways to deal with their garbage.

Recycling supported a huge processing industry in China, from the

e-waste recyclers of Guangdong province to one of the country's wealthiest women in Nine Dragons Holdings, but took a huge toll on the

# Bulletin Board

## Gossip

SEP. 25, 2020

environment. Left unchecked, China will have up to 17.8 million tonnes of littered plastic waste to deal with by 2025, the projection cited by Oxford shows. It's not just China's problem. East Asia and South Asia contributed 71 per cent of global mismanaged plastic wastes in 2015, according to the university's data.

Plastic waste that gets into the ocean releases toxins as the material breaks down slowly. Scraps end up being eaten by seabirds, turtles and fish, while plastic fasteners often suffocate marine mammals and seabirds.

The planet's oceans will have more plastics than fish by 2050, going by the current rate of pollution, according to a warning by the United Nations Environment Programme.

Of the 100 million tonnes of plastic waste generated by 2 billion people living within 50 kilometres from the coast, some 8 million tonnes of plastics – equivalent to the amount carried by a garbage truck every minute – enters the ocean annually, according to Washington-based non-profit organisation Ocean Conservancy. This adds to an estimated 150 million tonnes already circulating the marine environment.

Global plastic pollution is accelerated by decades of rising consumerism, urbanisation and recently by the coronavirus pandemic that drove up plastic packaging used in online shopping and takeaway food consumption.

An estimated 40 per cent of global plastic wastes end up in the environment, with the rest recycled, incinerated or put into landfills, according to the Alliance to End Plastic Waste. Formed last year, it is backed by 47 international petrochemical producers, consumer brand owners, retailers and recyclers.

"Based on the numbers we are seeing, if we don't see a change in the way plastic wastes are managed and the establishment of sustainable consumption systems, a lot more of them will end up in the environment," said Jacob Duer, the Alliance's Singapore-based chief executive. "The plastic problem is immense, urgent and complex"

The vast majority of used plastic packaging materials' estimated potential recycling economic value of US\$80 billion to US\$120 billion is lost worldwide every year, as only 14 per cent of used plastic packaging are collected for recycling, according to the World Economic Forum.

## Bulletin Board

## Gossip

SEP. 25, 2020

“We want to ensure that we capture the plastic before it enters the environment, but equally important, that the value of the plastic is captured through the circular economy thinking,” Duer said.

While implementation details of support policies are lacking in Beijing’s circular on the development of replacement products, Zhao said market forces will work out what products and which companies will emerge as winners.

“Many replacement products, such as biomass-based ones, are being developed,” he said. “Some companies have reach a certain level of production scale, while others are conducting trials.”

One of them is Kingfa Science & Technology. The company’s fully biodegradable plastics sales grew 49 per cent year-on-year, while that of eco-friendly high-performance recycled plastic rise 12.5 per cent in the year’s first half.

Kingfa said it expects to complete a project next year to double its 60,000 tonne-a-year production capacity for polybutylene adipate terephthalate (PBAT), a biodegradable and compostable copolymer.

The Guangzhou-based company is also building a 30,000 tonne-a-year production line for polylactic acid (PLA), a plastic material that is biodegradable when heated to above 55 degrees Celsius.

The company is working with Coca-Cola, L’Oréal and Unilever to use recycled fossil fuel-derived plastics in personal care products and food packaging materials.

Foreign firms are also doing their part. Days ahead of Beijing’s January reduce-and-replace edict, German chemical firm Covestro joined Chinese bottled water and beverage company Nongfu Springs and recycling firm Ausell to annually collect and recycle one million large polycarbonate water barrels weighing 1,000 tonnes no longer used. Nongfu this week raised HK\$8.35 billion in the

most overbought initial public offering in Hong Kong’s financial history.

The barrels are chopped, washed and re-pelletised, before being transformed by Covestro through chemical processes into plastics used to make products from electronic and home appliances to housing and auto parts.

“We did have a few recycling partners in the past, but this new three-way partnership to close the [material life cycle] loop is really the first time,”

## Bulletin Board

## Gossip

SEP. 25, 2020

said Holly Lei Huanli, president of Covestro China. “It is the first project of its type. Such partnership greatly improves the traceability and quality of recycled materials.”

However, not all polycarbonate can be easily recycled, she noted. Car headlamp covers are difficult to recycle because they are painted with a protective scratch-proof coating.

Covestro is the materials science unit spun off from German drug maker Bayer in 2015, which invented the versatile plastic polycarbonate in 1953.

The biodegradable plastics industry is expected to see explosive growth and benefit from China and global policies to reduce traditional plastics usage, Zhongtai Securities’ analysts said last month.

The global market for biodegradable packaging is projected to grow at a compound annual rate of 13.6 per cent to US\$32.7 billion by 2027 from an estimated US\$13.4 billion this year, according to market researcher ReportLinker.

The European Union last year passed a law banning single-use plastic items such as plates, cutlery, straws, polystyrene cups and cotton buds sticks by next year.

Member states must achieve a 90 per cent collection target for plastic bottles by 2029, and which will have to contain at least 30 per cent recycled content by 2030.

Legislators in California, which before 2018 sent most of its recyclable plastic wastes to China, last year failed to pass the most ambitious bill in the nation to ban the production or sale of any non-recyclable single-use plastic packaging in the state by 2030.

Still, legislation is only part of the solution to the global plastic problem, which also requires innovation by industries, funding and consumers’ support to make plastic consumption sustainable.

Current challenges facing the industry include insufficient incentives and infrastructure to collect sufficient plastic materials and the technical barriers in turning plastic materials back to usable format, said Jonathan Penrice, the Asia head of the US chemicals producer Dow.

“The plastic recycling problem requires local solutions,” Penrice said. “The petrochemical industry has been around for 100 years, while the circular economy is only just starting Both the challenges and opportunities are pretty immense. It will require a lot of material science innovation.”

## Bulletin Board

## Gossip

SEP. 25, 2020

The company aims to collect, reuse or recycle one million tonnes of plastics by 2030 through its direct actions or partnerships, and have all its products sold into packaging material that can be reusable or recyclable by 2035.

In Thailand, Vietnam, the Philippines, India and the US, it has projects to shred and melt mixed plastic wastes, to replace 4 per cent of bitumen used in asphalt roads.

Dow is also in early stages of collaboration with Netherlands-based recycling technology developer Fuenix to develop a chemical process to degrade mixed plastic wastes into liquid oil and gases at high temperature, and reuse the material to make plastic products.

Alliance to End Plastic Waste, of which Dow and Covestro are founding members, has pledged to spend US\$1.5 billion over five years to help fund projects of start-ups to come up with innovative solutions to cut and reuse plastic waste.

The alliance has had early discussions with multilateral development banks on co-financing pilot integrated plastic wastes management and recycling projects, to “de-risk” and make them “bankable” for commercial financiers including venture capital firms, said its CEO Duer.

“We have been contacted by venture capital firms on a weekly basis looking for scalable projects, but they are not yet available,” he said.

scmp.com, 12 September

<https://www.scmp.com>

### The best news of 2020? Humanity may never hit the 10 billion mark

2020-09-10

While watching 2020 unfold has been like watching someone set themselves on fire with a bucket of bacon grease and a firecracker, one morning I stumbled on something that made me smile, and then jump for joy: A new study found that the global human population might peak at just under 10 billion people in the 2060s before tapering off to 8.8 billion by 2100.

What miracle could achieve such a slowdown in human reproduction after a century of smack-yourself-in-the-face runaway growth? It's not war, or nuclear holocaust, or plague (COVID-19, as tragic as its mishandling has been by certain governments, will do little to slow down population

## Bulletin Board

## Gossip

SEP. 25, 2020

growth). It's two things, both wonderfully non-violent: women's education, and access to birth control.

The new findings, published in the medical journal *The Lancet*, differ from other population forecasts, most importantly by the United Nations Development Programme (UNPD) and the Wittgenstein Centre, by predicting that the global population will peak sooner than expected and fall quicker than anticipated (though still, by 2100, the Earth would house more humans than the 7.8 billion of us here today).

This was good news. No, no, this was freaking great news. Because if this research — which made some clever shifts in how it analyzed the data and predicted the future — could be believed, it could mean that Planet Earth, in all its ecological glory, might just survive our current devastating onslaught and begin to recover in the coming centuries. Assuming we, of course, actually deal with climate change. A big assumption.

However, no one else seemed to see it that way. Coverage of the paper's findings looked more like Munch's “The Scream.”

Perhaps the most ridiculous of these articles came from the BBC, which spent about 1,000 words freaking out over the idea that the human population won't go on growing forever and societies might have to ... adapt. Oh, no! Humans have never had to do that.

There is only a single mention of the environment in the BBC article.

“You might think this is great for the environment,” it reads. “A smaller population would reduce carbon emissions as well as deforestation for farmland.” But then the piece goes on to never finish the thought, which seems to suggest that fewer people is *not* great for the planet as a whole (huh?).

Of course, part of the problem is the scope of the paper itself. It pays lip service to environmental issues and climate change, but makes little mention beyond the fact that having fewer humans around might be beneficial in solving these problems. The connection between population and climate change is tenuous at best, but one thing is certain: a booming population is not going to make fighting climate change any easier.

Worse still, the paper makes *zero* mention of other ecological crises: the vast destruction of the world's forests, the spiraling mass extinction, the overfishing of our seas, the decline of insects in at least some regions, the extensive use of pesticides and herbicides, the infiltration of the last wildernesses, and the destruction of Indigenous people and cultures.

## Bulletin Board

## Gossip

SEP. 25, 2020

Crises, by the way, that threaten human health and society. Just ask Covid-19.

Instead, the research focuses almost solely on how fewer births will impact the economy — assuming that the only way forward is unending economic growth.

Will there be economic challenges? Sure. But I'd hazard the challenges posed by an aging population are going to be far easier to solve than those posed by a total breakdown of Earth's ecological limits, something we're already dangerously close to. When it comes to an older population, we already have potential solutions and examples to soften the impact, such as automation, robotics, policy shifts, new ideas like universal basic income, and evolving views around economics.

Maybe we don't have to play the neoliberal capitalism game forever? Maybe we could increase funding for the care of the elderly instead of giving billionaires tax cuts or spending trillions on the military?

At one point, the study claims Japan will see its population shrink by half *and* then says Japan could still be the fourth-largest economy. Boohoo.

While the research clearly bemoans the challenges of a world where women have fewer children, the alternative is quite simply ludicrous. Is the human population — already tearing the seams of our planetary ecological limits — supposed to just go on growing forever? Perhaps 10 billion humans just isn't enough and we should aim for 20, 40, why not 100 billion people?

How to feed, house and clothe us all? Oh, no worries, by then I'm sure we'll have terraformed Mars — easily done on a planet we have never set foot on — and invented light-speed travel to bounce around the galaxy. Ha! Let's get back to reality: if we can't even take care of the planet that cradles us, what chance do we have of making good on others?

The only alternative to endless population growth is population decline. And the only alternative to wrecking our Earth is treating it differently. And this, of course, highlights the problem with our obsession with GDP and never-ending economic growth. As has been pointed out by many conservationists (originally by the economist Kenneth Boulding in the 1960s), "Anyone who believes in indefinite growth...on a physically finite planet, is either mad or an economist."

## Bulletin Board

## Gossip

SEP. 25, 2020

We also seem to forget that the human species only hit 1 billion people around 1800. In other words, for more than 99.9% of our time on Earth, we did just fine at the things humans like to do — community, sex, art, religion, philosophy, war — with *fewer* than a billion people.

So, humans will be fine — *if* we avoid ecological catastrophe and total climate breakdown. And a slowing population allows us to have a bit of a better chance on both of those. I say "a bit" because human population is just one part of the equation. The other is consumption. We might miss the worst of the predicted population growth, but we still have to rein in our material consumption.

Just don't tell the economists that.

Meanwhile, I'll celebrate a little. Our incredible, nonviolent revolution of contraceptives, birth control, women's rights, and education for girls might just prevent our species from destroying the world.

[news.mongabay.com](https://www.news.mongabay.com), 10 September 2020

<https://www.news.mongabay.com>

### A sobering breakdown of severe COVID-19 cases shows young adults can't dismiss it

2020-09-09

Although older adults face the highest risk of being hospitalized with or dying from COVID-19, younger adults can also end up in the hospital (*SN*: 3/19/20). If they do, the outcome can be serious, and a new study is providing a look at just how severe the disease can be for those patients.

Of roughly 3,200 people ages 18 to 34 who were admitted to 419 U.S. hospitals from early April to the end of June, 21 percent, or 684 people, landed in intensive care and 10 percent, or 331 patients, ended up on ventilators. Almost 3 percent, or nearly 90 people, died, researchers report September 9 in *JAMA Internal Medicine*.

Those numbers are "alarming figures given that COVID-19 outbreaks are rampant in many U.S. colleges that have opened for in-person learning," says Aubree Gordon, an epidemiologist at the University of Michigan in Ann Arbor. Younger adults now make up nearly a quarter of U.S. coronavirus cases.

A 3 percent death rate is lower than what has been reported for hospitalized older adults with COVID-19 — which was more than 20

**Younger adults now make up nearly a quarter of U.S. coronavirus cases.**

## Bulletin Board

## Gossip

SEP. 25, 2020

percent in two separate studies from the United States and Germany — but still higher than it is for some other illnesses. For instance, it's more than twice the death rate for heart attacks in young adults, the researchers wrote.

Underlying conditions like severe obesity or high blood pressure were linked to more serious illness or death. And the team found that younger adults who have multiple underlying conditions can face similar risks of serious illness and death as people 35 to 64 years old without those conditions. More than half of the hospitalized young adults were Black or Hispanic, although race or ethnicity was not associated with an increased risk of death or needing a ventilator.

Seeing more severe disease in younger adults with underlying conditions mirrors findings from larger populations that include people from other age groups, says Aaron Milstone, a pediatric infectious disease specialist at Johns Hopkins University.

Because the study considered only hospitalized patients, it can't say what the risk is for young adults in general who are infected with the coronavirus, he says. But "if you get hospitalized, your risk of complications is high, and that should be concerning for everyone whether they are a child, young adult or senior citizen," Milstone says.

What's more, 3 percent of the people who survived their hospital stay needed more care in a nursing facility afterward. It's unknown whether any of the other patients discharged from the hospital suffered from lingering COVID-19 symptoms.

"Young people often shrug off their risk, citing their age," Gordon says. But the findings underscore the fact that younger people at still at risk of severe symptoms, she says, particularly if they have other health conditions.

sciencenews.org, 9 September 2020

<https://www.sciencenews.org>

### Half a million cases of COVID-19 diagnosed in US children

2020-09-10

More than half a million children in the U.S. have tested positive for the novel coronavirus since the start of the pandemic, according to a new report.

## Bulletin Board

## Gossip

SEP. 25, 2020

Though children rarely develop serious illness from the virus, they aren't immune to it. A new report from the American Academy of Pediatrics (AAP) finds that children represent about 9.8% of all COVID-19 cases in states that have recorded demographic data.

This data was available from 49 states, New York City, the District of Columbia, Puerto Rico and Guam. In the past two weeks, the number of COVID-19 cases in children increased by 16% as 70,630 new cases were reported in children.

But it's rarer that a child will develop serious illness or die from COVID-19.

A smaller number of states reported hospitalizations and mortality data based on age. In 23 states and NYC, children made up 0.7% to 3.7% of total reported hospitalizations. Between 0.3% and 8.3% of children who had COVID-19 ended up hospitalized, according to the report.

In 42 states, children made up 0% to 0.3% of all COVID-19 deaths; in 18 of those states, there were no deaths in children. Of the child COVID-19 cases, 0% to 0.2% resulted in death, according to the report.

"These numbers are a chilling reminder of why we need to take this virus seriously," AAP President Dr. Sara "Sally" Goza said in a statement. "While much remains unknown about COVID-19, we do know that the spread among children reflects what is happening in the broader communities."

As in the pandemic as a whole, there were stark disparities in which children were likeliest to be diagnosed.

"A disproportionate number of cases are reported in Black and Hispanic children and in places where there is high poverty," she added. "We must work harder to address societal inequities that contribute to these disparities."

Previous studies have suggested that children can also transmit the virus to others, raising fears that reopening schools might increase the risk of transmission to adults in their households. One study conducted in South Korea and published on July 16 in the journal Emerging Infectious Diseases found that older children were just as likely as adults to transmit the disease.

*Originally published on Live Science.*

livescience.com, 10 September 2020

<https://www.livescience.com>

# Bulletin Board

## Gossip

SEP. 25, 2020

### Chemists turning bricks into energy storing devices

2020-08-12

Chemists from St Louis' Washington University are turning bricks into energy storage devices.

To transform the red brick from a commonly used building material used in the construction industry into supercapacitors to charge devices, the chemists applied a coating to the brick of the conducting polymer PEDOT, which is composed of nanofibers capable of penetrating brick.

Once the coating penetrates the brick, it operates like an ion sponge inside of the brick, storing and conducting electricity. Meanwhile, the pigment that gives the bricks their red hue — iron oxide (or rust) — causes a polymerization reaction.

The end result, according to the team of chemists, are energy-storing bricks capable of holding substantial stores of energy to charge devices like LED lights, for instance.

Enhancing bricks in a building with this capability, according to researchers, could mean that the bricks could serve as an emergency power source in the event of grid outages, for example.

The chemists detail their findings in the paper, "Energy storing bricks for stationary PEDOT supercapacitors," which is published in the journal [Nature Communications](#).

For more on the bricks, watch the accompanying video that appears courtesy of Washington University.

[insights.globalspec.com](https://www.insights.globalspec.com), date

<https://www.insights.globalspec.com>

### South Australia's ban on single-use plastic cutlery and straws hailed as 'historic'

2020-09-11

South Australia has become the first Australian state to introduce laws banning some single-use plastics including cutlery, straws and stirrers.

Environmental campaigners say the laws, likely to come into force in early 2021, are historic and will help protect wildlife on land and in the oceans.

# Bulletin Board

## Gossip

SEP. 25, 2020

But the National Retail Association, which represents 28,000 outlets around the country, said retailers in SA had not been given enough time to adjust and the legislation's definition of "single-use" needed to be clearer.

South Australia's laws mean that selling, supplying or distributing a "prohibited plastic product" will be illegal.

On the list of banned items are single-use plastic straws, cutlery and drinks stirrers, as well as polystyrene cups, bowls, plates and clamshell containers.

The legislation also lists items that are under consideration to be added to the banned list, including single-use coffee cups and lids and single-use plastic bowls, plates, food containers, balloon sticks, balloon ties, bags and plastic-stemmed cotton buds.

Exemptions have been put in place for people with a disability or a medical need to use the banned items.

The SA environment minister, David Speirs, said no specific date has been set for the laws to come into force, with Covid-19 restrictions still having an impact on society and the hospitality industry.

"This will give businesses time to bounce back and properly prepare before the ban comes into effect in early 2021. This approach strikes an appropriate balance between the public's desire for change and the needs of businesses."

SA's new laws also ban plastics that have additives to make them break apart more quickly into smaller pieces – known as oxo-degradable plastics.

Scientists studying the impacts of plastics on the environment say that as plastics break apart into smaller and smaller pieces, they become available to a wider array of wildlife.

Jeff Angel, director of the Boomerang Alliance, which represents 52 environment and conservation groups on plastics, congratulated the SA government on ground-breaking laws.

He said: "These plastic items are amongst the most littered and represent a major threat to the environment and to wildlife. They all have available and better alternatives."

Switching to reusable and compostable items was achievable and would cut costs and waste, he said.

**The end result, according to the team of chemists, are energy-storing bricks capable of holding substantial stores of energy to charge devices like LED lights, for instance.**

## Bulletin Board

## Gossip

SEP. 25, 2020

Shane Cuow, plastics spokesperson for the Australian Marine Conservation Society, said: "SA has long been ahead of the curve on plastics. They were the first state or territory to introduce a container deposit scheme way back in 1977 and the first to ban plastic bags in 2009.

"These historic new laws will prevent lethal plastic straws and cutlery from entering South Australia's waterways and oceans, potentially saving the lives of countless seabirds, dolphins and whales."

He said some birds feed plastic pieces to chicks, and other animals eat plastics causing life-threatening blockages.

Angel and Cuow said other states and territories needed to follow SA and pass their own laws.

Queensland and the ACT already have legislation before their parliaments. Western Australia and New South Wales have held public consultations on similar laws, and Angel hoped legislation would follow in those states later this year.

The Australian Packaging Covenant Organisation – a collaboration between federal and state governments and industry – has a national target to phase out of "problematic and unnecessary single-use plastics packaging" by 2025.

Ebony Johnson, a policy manager working on plastics at the National Retail Association, told Guardian Australia any new laws needed to be nationally consistent.

The association was part of the SA taskforce to develop the laws, but Johnson said a timeline of "early 2021" did not give retailers enough time to find alternative products or develop new approaches.

"Early 2021 is unrealistic for most retailers," Johnson told Guardian Australia. "This can be very complex for small businesses."

The association said in a statement it congratulated the government on the new laws and said its members were "eager to comply".

The SA legislation defines single-use as "a product designed or intended to be used once or for a limited number of times before being disposed of" – a definition the association said was ambiguous.

## Bulletin Board

## Gossip

SEP. 25, 2020

Johnson said the phrase "a limited number of times" was open to interpretation. "What about a plastic baby spoon or a picnic set?" she said. "We need clarity to obey a law."

[theguardian.com](https://www.theguardian.com), 11 September 2020

<https://www.theguardian.com>

## Possible hint of life discovered on Venus

2020-09-14

An unexplained chemical has turned up in the upper atmosphere of Venus. Scientists are tentatively suggesting it could be a sign of life.

The unknown chemical is phosphine gas (PH<sub>3</sub>), a substance that on Earth mostly comes from anaerobic (non-oxygen-breathing) bacteria or "anthropogenic activity" — stuff humans are doing. It exists in the atmospheres of gas giant planets, due to chemical processes that occur deep in their pressurized depths to bind together three hydrogen atoms and a phosphorus atom. But scientists don't have any explanation for how it could appear on Venus; no known chemical processes would generate phosphine there. And yet, it seems to be there, and no one knows of anything that could make phosphine on Venus except for living organisms.

This discovery, published today (Sept. 14) in the journal Nature Astronomy, caught everyone by surprise — including the team that found it.

Back in June of 2017, that team pointed the James Clerk Maxwell Telescope in Hawaii at Venus and tuned it to look for signatures of phosphine. "The aim was a benchmark for future developments," they wrote in the journal article.

In other words, they were checking what the phosphine signatures might look like as a baseline, on a planet assumed to have no natural way of producing the substance.

"But unexpectedly," the researchers wrote in the study, "our initial observations suggested a detectable amount of Venusian PH<sub>3</sub> was present."

They confirmed what they were seeing using the Atacama Large Millimetre/submillimetre Array in Chile. Variations in the light coming from Venus' upper atmosphere showed a substantial amount of phosphine there.

**But scientists don't have any explanation for how it could appear on Venus; no known chemical processes would generate phosphine there.**

## Bulletin Board

## Gossip

SEP. 25, 2020

But phosphine on Venus doesn't necessarily mean life on Venus, the authors wrote. They raised the possibility of life because bacteria are the only known way of making phosphine on a planet without a gas giant's super-high atmospheric pressures. But it's just as possible that some previously-unknown chemical process is producing the gas.

"This could be unknown photochemistry [chemical reactions that require light] or geochemistry, or possibly life," they wrote. "Information is lacking — as an example, the photochemistry of Venusian cloud droplets is almost completely unknown."

That means that no one really knows how the chemicals in Venus' upper clouds react to sunlight.

Venus has not previously been considered a likely site for life in this [solar system](#), so scientists had yet to explore such questions with the same level of resources devoted to hunting for signs of life on Mars. The hot, almost Earth-size planet with its toxic atmospheric [chemistry destroys even the hardest robots](#) within minutes. How would life survive on Venus?

In the past, the authors of the new paper pointed out, some researchers have suggested the possibility of life in the planet's uppermost cloud layer. Unlike the surface, which averages 867 degrees Fahrenheit (464 degrees Celsius), Venus' higher clouds are relatively cool, reaching 85 F (30 C) in the layer where phosphine was detected, and could more plausibly offer a habitat for some sort of floating life.

Figuring out whether that really is the source of Venusian phosphine, or whether it came from some other source, will take more data and better modeling of the planet's behavior, the researchers wrote.

Originally published on *Live Science*.

[livescience.com](https://www.livescience.com), 14 September 2020

<https://www.livescience.com>

### Ethical or exploitative—should prisoners participate in COVID-19 vaccine trials?

2020-09-14

As 38 clinical trials seek tens of thousands of volunteers to receive doses of experimental vaccines, researchers are discussing how to find and recruit participants effectively and ethically. Some people who are especially vulnerable to COVID-19 [have not been well represented in studies](#)—or

## Bulletin Board

## Gossip

SEP. 25, 2020

represented at all. Prisoners, for instance, have borne a heavy burden of COVID-19, with more than 125,000 U.S. prisoners infected, and more than 1000 dead. But prisoners have also been excluded from the trials out of concern that they might be coerced into participating or exploited if they do.

Now, some researchers argue that including prisoners in studies could offer outside health benefits. Correctional facilities have experienced many COVID-19 outbreaks and are structurally unsuited to social distancing (among other precautions). And so, the researchers argue, like other people at high risk of catching the disease, prisoners should be allowed to participate in clinical trials.

*ScienceInsider* spoke with George Annas, a lawyer and bioethicist at Boston University, whose research addresses ethics and human rights in clinical trials, and Lauren Brinkley-Rubinstein, a sociologist and epidemiologist at the University of North Carolina, Chapel Hill, who studies management of infectious disease and substance abuse in incarcerated people. Both have published about health and ethics in holding facilities during the pandemic: In July, Annas wrote in *The New England Journal of Medicine* about [inhumane medical practices](#) in immigrant detention centers and, in August, Brinkley-Rubinstein and colleagues argued in *JAMA* that [prisoners should be included in vaccine trials](#).

This interview has been edited for brevity and clarity.

#### Q: What clinical research has been done historically in correctional facilities? Has it been done well?

**George Annas:** The history is pretty dark. It's a history of research done without consent, without oversight, and without consequences. It starts in some respects with the Nazis, since Holocaust research—or pretend research, really—was done in prisoners to get scientific information for the German state. Another famous experience was John Charles Cutler's 1940s experiments in Guatemalan prisons. In those experiments, prisoners were deliberately infected with gonorrhea, syphilis, and chancroid.

**Lauren Brinkley-Rubinstein:** There are lots of instances of prisoners being intentionally infected with diseases in order to develop new drugs, including malaria and hepatitis C. Horrible things happened at San Quentin [State Prison], including giving prisoners experimental testicular transplants. I think dark is the right word.

**Prisoners, for instance, have borne a heavy burden of COVID-19, with more than 125,000 U.S. prisoners infected, and more than 1000 dead.**

## Bulletin Board

## Gossip

SEP. 25, 2020

**Q: Is any COVID-19 vaccine research taking place in correctional facilities? Has anyone put forward serious proposals to do such research?**

**L.B.R.:** There was some conversation at the federal level at the initiation of large vaccine trials to include people involved in some way with the criminal justice system. My colleagues and I had a couple of phone calls with people involved in running those trials to see if it was something they'd entertain. There was some openness to it. But ultimately, including incarcerated populations felt too cumbersome. Between the ethical risks and the operational obstacles to actually get the sites up and running, it would have required a lot of extra effort.

**G.A.:** Up until recently, there's really been no excuse to do research in these settings. But it's a strange and perhaps intriguing group to study, because they're almost definitely going to be exposed to the virus. So, it could give you answers you may not get if you trial the general population—who may not ever be exposed. That's why we're looking again. I'm not a big fan of prison research, but I am a big fan of science, so I think we should look at all these things again.

**L.B.R.:** Still, I think part of this conversation should be focused on people on probation or parole—the high-risk population that is criminal justice involved, but not presently incarcerated.

**G.A.:** Yeah. I'd be much more amenable to efforts to bring people on probation or parole into trials. They would be unshackled, literally, from some of the risks of exploitation we think about for prisoners who receive perks for "good" behavior and punishment for "bad" behavior.

**Q: Could this kind of research actually benefit incarcerated people if they participate?**

**L.B.R.:** It definitely could, assuming the vaccine works. Incarcerated people do have different risks, in terms of the barriers they face to getting certain elements of routine health care along with their potential to be exploited. But they also potentially would gain more from vaccination, given these settings are extreme amplifiers of infection.

**G.A.:** But the risk if an experimental vaccine doesn't work is that these individuals won't only be disappointed, but they'll feel they were lied to or exploited.

**L.B.R.:** Another big part about why understanding these contexts is important is that we do eventually want vaccines to be made available

## Bulletin Board

## Gossip

SEP. 25, 2020

to these populations. But there are lots of implementation issues that are very particular to jails and prisons. How do we store the vaccines under potentially very specific conditions? How do we monitor patients for side effects after injections? How we manage any needed follow-up, like a booster shot? We need to get expertise to optimize these programs when vaccines are eventually deployed. I don't think that alone is justification to do a trial, but it is such a big part of vaccines being effective once they are approved. It's something we'll have to figure out.

**Q: Could there be broader public health advantages for doing COVID-19 vaccine research in correctional facilities? Would experimental use of vaccines in correctional facilities benefit staff, neighboring communities, and more distant ones?**

**L.B.R.:** If the experimental vaccines work, then the public health benefit of focusing vaccine resources—even during trials—on correctional facilities cannot be overemphasized. We've already seen that jail churn plays a tremendous role in community transmission.

**G.A.:** To me, it's a different experiment. You can't use community results to justify research on individuals. The risk-benefit analysis needs to come out right for the individual before they can consent to being in the trial.

**Q: If such research is undertaken, how will we know whether ethical safeguards did enough to protect participants' rights?**

**G.A.:** There probably is no replacement for asking the participants themselves. Did they feel exploited? Did they feel used? Did they feel fulfilled? Did they feel part of something bigger?

**L.B.R.:** This is really at the crux of the issue. We'd have to ask, but also to appoint oversight boards that have prisoner representation. And we'd have to adopt other safeguards to ensure we are doing things ethically.

**Q: Would giving prisoners the option to participate in a vaccine trial set a precedent for future research? What about continuing to withhold access?**

**G.A.:** I think the question of "if not now, when?" is a very good one. We have a worldwide pandemic with a giant prisoner population that's very susceptible to the disease and is dying from it. If we're not going to permit research in that circumstance, we're never going to permit it.

## Bulletin Board

## Gossip

SEP. 25, 2020

**L.B.R.:** Also, if we can figure out how to do this right—given the stakes right now—that could give back some element of power or respect that is otherwise not present in these places.

**G.A.:** It's a question of whether we treat prisoners as human beings with agency, who are allowed to participate in something for the public good.

**L.B.R.:** Our approach to experimentation in prisons has been very binary: a history of serious abuses of power when we have run trials, versus the decision to completely avoid including prisoners in trials. We have to ask ourselves whether there's a middle path.

**G.A.:** And considering a middle path, but then deciding it's too much work—that would be an extreme position, too.

**Q: As the prospect of an approved vaccine nears, fierce debate surrounds who should receive it first. According to current Centers for Disease Control and Prevention guidance, prisoners are not considered separate from the general population, putting them last in line. In contrast, a draft proposal released this month by the National Academies of Sciences, Engineering, and Medicine said prisoners should get vaccinated after health care workers, but before the general population. Where do you think incarcerated people belong on the priority list?**

**L.B.R.:** Based on the evidence we have about outbreaks, incarcerated people should be at the top tier. There's a clear connection between what happens in these institutions and what happens in the community. When we have infections that spread in jails or prisons like wildfire, and staff going in and out and in and out, we're making COVID infection more likely everywhere. If the only thing you cared about was your own health, you would still make the decision to prioritize them.

**G.A.:** People at the highest risk should receive the treatment first. That includes prisoners. It's that simple, really.

sciencemag.org, 14 September 2020

<https://www.sciencemag.org>

## Bulletin Board

## Gossip

SEP. 25, 2020

### This moth may outsmart smog by learning to like pollution-altered aromas

2020-09-11

Pollution can play havoc with pollinators' favorite flower smells. But one kind of moth can learn how to take to an unfamiliar new scent like, well, a moth to a flame.

Floral aromas help pollinators locate their favorite plants. Scientists have established that air pollutants scramble those fragrances, throwing off the tracking abilities of such beneficial insects as honeybees (*SN*: 4/24/08). But new lab experiments demonstrate that one pollinator, the tobacco hawkmoth (*Manduca sexta*), can quickly learn that a pollution-altered scent comes from the jasmine tobacco flower (*Nicotiana glauca*) that the insect likes.

That ability may imply that the moth can find food and pollinate plants, including crucial crops, despite some air pollution, researchers report September 2 in the *Journal of Chemical Ecology*. Scientists already knew that some pollinators can learn new smells, but this is the first study to demonstrate an insect overcoming pollution's effects on odors.

Chemical ecologist Markus Knaden and colleagues focused on one pollutant — ozone, the main ingredient in smog. Ozone reacts with flower aroma molecules, changing their chemical structure and therefore their fragrance.

Bottom of Form

In Knaden's lab at the Max Planck Institute for Chemical Ecology in Jena, Germany, his team blew an ozone-altered *N. alata* scent from a tiny tube into a refrigerator-sized plexiglass tunnel, with a moth awaiting at the far end of the tunnel. Usually, when the moth smells the unaltered floral fragrance, it flies upwind and uses its long, skinny mouthparts to probe the tube the way that it would a blossom.

The researchers expected that the modified scent might throw the moth off a little. But the insect wasn't attracted at all to a flower aroma exposed to levels of ozone that are typical on some hot, sunny days.

In addition to scent, tobacco hawkmoths track flowers visually, so Knaden's team used that trait, along with a sweet snack, to train the moth to be attracted to a pollution-altered scent. The researchers wrapped a brightly-colored artificial flower around the tube to lure the moth back across the tunnel, despite the unfamiliar aroma. And the team added sugar water

**The researchers expected that the modified scent might throw the moth off a little.**

## Bulletin Board

## Gossip

SEP. 25, 2020

to the artificial flower. After a moth was given four minutes to taste the sweet stuff, it was attracted to the new smell when sent into the tunnel 15 minutes later, even when neither the sugar water nor the visual cue of the artificial flower was present.

In the lab, researchers showed that tobacco hawkmoths can learn to drink from a fake flower whose scent has been scrambled by pollution. To train the moths to accept the altered scent, a visual cue — dressing up a tube emitting a fouled bouquet as an artificial flower — attracts the moth, and a sugar-water reward teaches the insect that it's worth a return trip.

Still, in an ozone-polluted environment in the wild, tobacco hawkmoths would have to be close enough to a tobacco flower to see it to learn its altered scent, and Knaden isn't sure how often that will occur. The moths are difficult to observe in nature because they feed at twilight and are fast flyers.

"This study is a clarion call to other scientists" to examine whether and how different pollinators might also adapt to human-driven changes to their environment, says chemical ecologist Shannon Olsson of the Tata Institute of Fundamental Research in Bangalore, India, who wasn't involved with the work.

Although the results suggest that some adaptation by insects to pollution is possible, Knaden is cautious about being too optimistic. "I don't want the take-home message to be that pollution is not a problem," he says. "Pollution is a problem."

This study focused on only one moth species, but Knaden's team is now working on planning experiments with other pollinators that are easier to follow than tobacco hawkmoths. While he suspects honeybees might also be as adaptable as the moth was, that won't be true of every pollinator. "The situation can become very bad for insects that are not as clever or cannot see that well."

sciencenews.org, 11 September 2020

<https://www.sciencenews.org>

## Bulletin Board

## Curiosities

SEP. 25, 2020

**Is coconut oil healthy?**

2020-09-10

REMEMBER THE DAYS walking down the supermarket aisle to purchase cooking oil when you basically had just a few choices – like olive oil, corn oil or canola oil?

Nowadays the selection appears endless, making it rather challenging to choose – especially since some oils are associated with health claims almost too good to be true. Coconut is one oil that's surrounded by health claims. And because of this, it's also surrounded by a wealth of controversy. Let's take a closer look.

**Nutrition Profile**

One tablespoon of coconut oil is around 120 calories – similar to other oils. However, it's predominately made up of saturated fats, 80 to 90% to be exact. Saturated fat has been found to increase low-density lipoproteins (LDL) cholesterol levels (aka «the bad cholesterol») and, according to the American Heart Association, puts you at a greater risk for heart disease.

However, the structure of the saturated fat in coconut oil differs from those found in animal products, as it consists of medium-chain triglycerides (aka MCT), versus the long-chain triglycerides found in butter, bacon and other animal-based fat. The importance of this is that MCT oils, specifically lauric acid found in coconut oil, has been associated with an increase in HDL, or high-density lipoprotein (aka "the good cholesterol").

It's important to note, though, that not all varieties of coconut oil are created equal, and that those called virgin or unrefined will typically have more MCTs and lauric acid than those that have been overly processed.

**Health Claims****1. Coconut oil is good for your heart.**

Here's where one of the biggest controversies plays out. Even though there is some research to support that MCTs may increase HDL cholesterol levels, other research found an increase in LDL cholesterol levels as well.

One scientific review, published in 2018, stated "that even though coconut oil has a relatively high MCT concentration, it should still be considered a saturated fat, and its consumption should not exceed the USDA's daily recommendation (less than 10% of total calorie intake)." That would be about 1.5 tablespoons of coconut oil.

**Coconut is one oil that's surrounded by health claims.**

# Bulletin Board

## Curiosities

SEP. 25, 2020

Another earlier [review](#) paper from 2016 concluded that virgin coconut oil showed promise in lowering cardiovascular risk. However, most of the studies included in this review were conducted on animals, not humans.

### 2. Coconut oil plays a role in cancer treatment.

One [study](#), consisting of 60 female participants with [breast cancer](#) undergoing chemotherapy for six cycles, found that consumption of virgin coconut oil helped improve their quality of life during treatment. And another [study](#), which looked specifically at tumor growth, found that lauric acid (found in coconut oil) had the potential to hamper tumor growth in regards to [colon cancer](#) cells, but coincidentally not breast cancer cells.

### 3. Coconut oil may decrease the risk for Alzheimer's disease.

This has been an area of research with promising results. One small study of 44 patients with [Alzheimer's](#) found that those individuals who received 20 ml (1.3 tablespoons) of coconut oil twice a day for 21 days showed cognitive improvement compared to those who didn't. Another pilot study published in the Journal of Alzheimer's Disease revealed that those patients following a [Mediterranean diet](#) including coconut oil also improved cognitively.

### 4. Coconut oil may aid in satiety and weight loss.

This is where it gets a little tricky. One study compared consumption of coconut oil, a 100% MCT oil and a vegetable oil to participant's food intakes throughout the day. Those who consumed the MCT oil were found to have an overall lower intake, concluding that coconut oil does not have the same effects as MCT oils. Similar to this research, a review paper concluded that studies that have showed satiating benefits used MCT oils exclusively, and in specific regards to coconut oil, more long-term clinical trials need to be conducted.

#### How to Store It

Most virgin or unrefined coconut oils come in solid form and can be safely stored at room temperature in the pantry with a shelf life of two years. If you prefer, you can store in the refrigerator, but keep in mind that it will become firmer in texture. Alternatively, if it is placed in a room that's warmer than 76 degrees, it will start turning to liquid, but it's still safe to consume.

#### How to Cook With Coconut Oil

# Bulletin Board

## Curiosities

SEP. 25, 2020

Coconut oil remains stable under heat and is best used over a medium heat for sauteing and stir-frying, yet not recommended for deep-frying. Virgin coconut oil has a coconut-like taste, whereas refined varieties are neutral in flavor. Either can be enjoyed similarly to other cooking oils in baking, salad dressings, sauces and marinades.

#### Bottom Line

The verdict is still out. If you're taking coconut oil solely for the health benefits, you might be disappointed and may even be putting yourself at risk for elevating your LDL levels. However, if you want to include it as one of many cooking oils you enjoy in moderation, go for it.

[health.usnews.com](http://health.usnews.com), 10 September 2020

<https://www.health.usnews.com>

### Digital wind: high-powered computing helps scientists grasp airflows at offshore wind farms

2020-09-08

At its theoretical peak, the Summit supercomputer at the U.S. Department of Energy's Oak Ridge National Laboratory in Oak Ridge, Tennessee, can calculate in one second what it would take the entire human population 305 days to do. That formidable mathematical horsepower comes in handy when modeling highly complex systems — such as how gusty sea winds hamper the performance of powerful offshore wind turbines.

That's why engineers at GE Research looking for ways to design next-generation wind turbines were thrilled in August when the DOE gave them access to Summit to allow them to take their concepts through their paces. Specifically, they wanted to analyze a kind of air current — called low-level coastal jets — that whip across the Atlantic off America's northeastern coast where operators are planning to build a number of large offshore wind farms.

A granular computational analysis of those gusts could squeeze more energy from the turbines in just the right manner without overloading them — boosting reliability, curbing maintenance costs and spurring the gradual shift toward more renewable energy. With wind power — both onshore and offshore — expected to provide 20% of the country's energy by 2030 according to the DOE, this math really matters.

**With wind power — both onshore and offshore — expected to provide 20% of the country's energy by 2030 according to the DOE, this math really matters.**

## Bulletin Board

## Curiosities

SEP. 25, 2020

The one-year research effort at Oak Ridge is part of a DOE program called the Advanced Scientific Computing Research Leadership Computing Challenge, or ALCC. GE engineers will work alongside federal researchers to develop supercomputer-driven models that explain wind dynamics and estimate their effects on entire wind farms.

Coastal low-level jets are currently not well understood but are of serious interest to the wind power industry, mainly because they're tricky to harness. In most atmospheric conditions, faster winds flow farther from the ground. But low-level jets accelerate from the ground up, reach the maximum wind speed and then slow down as they rise farther. Many scientists believe the jets come from the way wind flows from land to sea. While over land, coastal winds have to fight the ground's opposing frictional force, but as they blow out to sea — a comparatively smoother surface — they occasionally speed up.

Grappling with the interactions of low-level jets on an entire wind farm means modeling those airflows in both finer detail and at massive scale. The calculations are so complex because each individual wind turbine further disturbs the jets and adds a degree of entropy into the equations. That combination demands herculean number-crunching power — supercomputer-scale processing like that of Summit, a machine able to outperform 150,000 Xbox Ones. "With a supercomputer, you are no longer restricted to looking at how the wind flows through one blade," says Jing Li, lead aerodynamics engineer at GE Research. "You can get that information for dozens, if not hundreds, of turbines in a big wind farm."

Li and her team will employ advanced modeling techniques developed by the National Renewable Energy Laboratory for its ongoing Atmosphere to Electrons (A2e) research initiative. The core idea of A2e is that to accurately describe the world at different scales, you need different models for each one of them. "At the broadest level you have a climate model, then you drill down to a weather model, then to a wind model, to a wind farm, to a single turbine, to the flows over each individual blade and how the myriad wakes of each turbine affect the overall performance of the farm," explains Richard Arthur, senior director of digital engineering at GE Research.

"When computational scientists build models based on physics, it is necessary to limit the numerical complexity to what can be pragmatically run on available computer systems, so traditionally we employ different physics models for each scale," Arthur adds. "Integrating those multiple models across scales demands supercomputing."

## Bulletin Board

## Curiosities

SEP. 25, 2020

The work by Li and her team will come in three chunks over the next 12 months. First, they'll mine reams of wind data — for example, from [this field campaign](#) gathered by Massachusetts Clean Energy Center — to identify specific low-level jet patterns found in the northeastern coastal regions. Next, they'll run simulations to model the strength and speed of the jets over time and at heights that extend beyond the measurement range with fine spatial and temporal resolutions to resolve the energy-carrying atmospheric turbulence. Finally, they'll use the outputs from those simulations to model the airflow through a theoretical wind farm — ultimately calculating optimal load capacities and power production.

But there's more. The advances to modeling frameworks for complex turbulent flows that Li and company are exploring could apply to many applications. "This is a grand-challenge-scale problem," Arthur notes. "Turbulence manifests in a multitude of engineering and science problems, from wind, weather and climate to engines, generators and even healthcare applications, such as vascular blood flow or superconducting magnets in an MRI."

For now, Li can't wait to take the analysis of coastal jets to the next level. "During my second year of grad school, I went to a conference in Copenhagen, and it was the first time I saw an offshore wind farm," she recalls. "I was mesmerized by the sight of the spinning blades. I couldn't have imagined that a few years later I'd have the opportunity to study them and contribute to the offshore wind research community - so this is all very exciting!"

agriculture-xprt.com, 8 September 2020

<https://www.agriculture-xprt.com>

### How does cannabis get you high?

2020-09-11

Have you ever looked at your hands? I mean *really* looked at your hands?

You might think you have, but as the above classic [Doonesbury cartoon](#) implies, people who are high on [cannabis](#) may perceive mundane objects to be far more fascinating than usual.

How is it that a [plant](#) that first emerged on what's now the Tibetan Plateau can change humans' perception of reality? The secret lies in a class of compounds called cannabinoids. While cannabis plants are known to produce at least [140](#) types of cannabinoids, there's one

**How is it that a plant that first emerged on what's now the Tibetan Plateau can change humans' perception of reality?**

# Bulletin Board

## Curiosities

SEP. 25, 2020

that's largely responsible for many of the effects of feeling high. It's called tetrahydrocannabinol, or THC.

Marijuana: THC vs CBD

The marijuana compound CBD has received much attention for its potential to have therapeutic effects. But it is really more important than THC?

### PLAY SOUND

When a person smokes or inhales cannabis, THC "goes into your lungs and gets absorbed ... into the blood," according to Daniele Piomelli, a professor of anatomy & neurobiology, biological chemistry, and pharmacology at the University of California, Irvine School of Medicine. Edibles take slightly longer trip through the liver, where enzymes transform THC into a different compound that takes a bit longer to have an effect on people's perception of reality.

THC that's inhaled "reaches pretty high levels fairly quickly," Piomelli told Live Science. Within 20 minutes, the circulatory system is carrying molecules of THC to every tissue in the body, including the brain, where it can alter neural chemistry.

"From the lungs, it's a pretty straight shot to the brain," according to Kelly Drew, a professor of chemistry and biochemistry at the University of Alaska Fairbanks.

The THC molecules that pass the blood-brain barrier will find that they fit snugly into receptors that ordinarily receive compounds called endocannabinoids, which the body produces itself. These receptors are part of the endocannabinoid system, which is involved in several functions, including stress, food intake, metabolism and pain, according to Piomelli, who also directs the Center for the Study of Cannabis at UC Irvine.

"The endocannabinoid system is the most pervasive, diffused and important modulatory system in the brain because it controls the release of pretty much every neurotransmitter," Piomelli said. Neurotransmitters are molecules that brain cells, or neurons, use to communicate with each other. One neuron sends a message to the next by releasing neurotransmitters, such as dopamine or serotonin, into an infinitesimal gap that separates one neuron from the next. The gap is called the synapse.

# Bulletin Board

## Curiosities

SEP. 25, 2020

The neuron on the receiving end of the synapse is called the postsynaptic neuron, and it "decides whether to fire based on the input it receives," Drew told Live Science. These neural signals cascade through intricate circuits of neural connections that function on a tremendous scale; there are about 85 billion neurons in the brain and as many as 100 trillion connections among them.

The presynaptic neuron sends neurotransmitters across the synapse to the postsynaptic neuron, Piomelli said. But the presynaptic neuron can also receive information. When a postsynaptic neuron has fired, it can send a message across the synapse that says, "the neuron I come from has been activated," stop sending neurotransmitters, Piomelli said. It sends this "stop" message in the form of endocannabinoids that bind to a receptor called cannabinoid 1 (CB1).

### "Like a sledgehammer"

When THC enters the brain, the molecules diffuse into the synapses where they "activate CB1 receptors," Drew said. THC doesn't cause the most extreme possible response like some synthetic cannabinoids such as K2 or spice, but it does «turn up the volume» and increase the likelihood that the presynaptic neuron it affects will temporarily stop sending neurotransmitters, she said.

"The high is a very simple phenomenon, Piomelli said. "THC comes in like a sledgehammer," flooding the endocannabinoid system with signals the postsynaptic neurons didn't send. When presynaptic neurons across the brain get the memo to stop sending neurotransmitters, this alters the normal flow of information among neurons and results in a high.

Scientists have yet to decipher exactly what happens during this euphoria, however.

That's because, in part, U.S. legal restrictions make it difficult to study cannabis. But from what researchers have gathered so far, THC appears to temporarily "unplug" the default mode network. This is the brain network that allows us to daydream and think about the past and future. When our brains are focused on a specific task, we quiet this network to let our executive function take control.

There's evidence that THC has a significant effect on the network, but researchers aren't quite sure how it happens. There are cannabinoid receptors all over the brain, including in "areas that constitute the key nodes of the [default mode network]," Piomelli said. It could be "that

# Bulletin Board

## Curiosities

SEP. 25, 2020

THC deactivates the [default mode network] by combining with those receptors," but it's also possible that THC quiets the network through an "indirect effect that involves cannabinoid receptors in other brain regions."

Scientists are still working to find the mechanisms that result in a person feeling high, but there's some reason to think this effect on the default mode network is a significant piece of the puzzle.

Unplugging the default mode network "takes us into a mental place where the function of the things we experience is less important than the things themselves: our hands are no longer just something we use for touching or grabbing, but something with inner existence and intrinsic value," Piomelli said. Psychedelics, such as LSD or dried psilocybin-containing mushrooms, do the same thing.

However, people can experience highs differently. "The feeling of becoming fascinated by and 'connected' with ordinary things, things we see and use every day, is not universal but does happen, especially when high doses of THC-containing cannabis are used," Piomelli said.

THC doesn't just affect the default mode network. It may also, in the short-term, flood the brain with dopamine, the brain's reward signal, according to a 2017 study in the journal *Nature*. (Long-term, it may blunt dopamine's effects, the study found.) That, in part, may explain some of the euphoria associated with a high, and places cannabis in the company of other drugs that people use to feel pleasure.

"Every drug that has rewarding properties affects that system," Drew said.

### Aftereffects

The effects of a high from cannabis that's smoked or inhaled typically last for a few hours, though it can take edibles almost that long to start affecting users. And while cannabis isn't the dangerous substance it was made out to be in the 20th century, using it comes with some risk. For one, while cannabis is legal for recreational and medical use in some states, it's still illegal in many parts of the country.

It's also important to bear in mind that cannabis is a potent pharmacological substance. Cannabis can cross the placenta, so pregnant people should avoid it. And "heavy use in the teenage years can be problematic," Piomelli said. For instance, cannabis — and especially synthetic cannabinoids like spice — can exacerbate psychosis. "People who are at risk for that should not smoke it," Drew said.

# Bulletin Board

## Curiosities

SEP. 25, 2020

Finally, cannabis does affect the ability to drive, particularly in occasional users. Drew cautioned that people should not drive for three hours after smoking.

Eventually, the THC will leave the brain; the profusion of blood that brought THC into the brain will carry it to the liver, where it will be destroyed and expelled in urine.

And you're not gonna believe this, but your hands — they were the same the whole time.

*Originally published on Live Science.*

[livescience.com](https://www.livescience.com), 11 September 2020

<https://www.livescience.com>

### Biocoating boosts bacterial viability for wastewater treatment

2020-09-01

A porous biocoating synthesized with a permeable structure might find use in encapsulating and corralling bacteria for wastewater treatment functions.

The permeability of the material, composed of rigid tubular nanoclays and latex particles, can be tuned to support a high rate of nutrient and metabolic product transport sufficient for bacterial viability. The biocoating was tested with *Escherichia coli* as a model organism, using the expression of a yellow fluorescent protein as an indicator of metabolic activity. Single-cell observations using confocal laser scanning microscopy provided evidence of these biological mechanisms.

A custom-built apparatus based on a resazurin reduction assay indicated no measurable permeability in a coating made from only latex particles. The permeability coefficient of composite biocoatings increased up to a halloysite nanoclay content of 29%. Bacteria encapsulated in halloysite composite biocoatings had statistically significant higher metabolic activities in comparison to bacteria encapsulated in a nanooptimized coating made from latex particles alone.

The biocoatings were demonstrated by researchers from University of Surrey and University of Warwick, U.K., to maintain bacterial viability for

**Single-cell observations using confocal laser scanning microscopy provided evidence of these biological mechanisms**

# Bulletin Board

## Curiosities

SEP. 25, 2020

extended time periods, enhancing their potential application in water pollutant degradation and removal.

insights.globalspec.com, 9 September 2020

<https://www.insights.globalspec.com>

### Alien-hunting telescope suffered 'no damage to electronics' during mysterious midnight disaster

2020-09-12

On Aug. 10, 2020, the Arecibo Observatory — a massive telescope in Puerto Rico famous for tracking asteroids and advancing the search for extraterrestrial intelligence (SETI) — was slashed to pieces after a metal cable above the telescope came loose in the dead of night and crashed through the radar dish below.

One month later, facility officials still don't know what caused the mysterious midnight malfunction. But the recovery effort is underway, and officials plan to launch a full "forensic investigation" into the disaster as soon as the facility's safety can be guaranteed, according to a statement from the University of Central Florida (UCF), which helps manage the telescope.

"We know the process is taking a long time and we are eager to begin repairs," Arecibo Observatory Director Francisco Cordova said in the statement. But before they can remove the broken pieces and get to work, they need to make sure it's safe to put people on the telescope, Cordova said.

When Arecibo began operating from the bottom of a natural sinkhole in 1963, it became the world's largest single-dish telescope, stretching 1,000 feet (305 meters) in diameter. (You might recognize it from its appearances in the films "Contact" and "Goldeneye").

But last month's cable collapse left a 100-foot-long (30 m) hole in the radar dish, immediately suspending operations, according to UCF. The cable also smashed through several other cables and platforms that support the dish, raining debris onto the ground and making access to the site even more treacherous.

Since then, UCF and its partners, including NASA and the National Science Foundation, have begun assessing the damage by building a detailed computer model of the telescope. Engineers will then study the model carefully before sending humans into the site. Initial tests of the telescope's

# Bulletin Board

## Curiosities

SEP. 25, 2020

receivers showed no signs of damage to the underlying electronics. However, the team has yet to test the telescope's critical S-band radar, which detects microwave signals from distant stars, galaxies and nebulae, the UCF statement added.

When the site's safety is assured, a repair team will extract the broken cable and its socket to begin their forensic investigation. In the meantime, two projects not connected to the main dish — Arecibo's Light Detection and Ranging (LIDAR) program and the Remote Optical Facility (ROF) — continue to operate, UCF said.

*Originally published on Live Science.*

livescience.com, 12 September 2020

<https://www.livescience.com>

### Multitasking algae treat wastewater, produce biofuel

2020-08-31

An algae-based agent with the capacity to photocatalytically produce biofuels and purify wastewater has been developed by researchers from Swiss Federal Laboratories for Materials Science and Technology (Empa).

Samples of Spirulina algae are coated with thin layers of nickel, zinc oxide and zinc sulfide nanoparticles. The combination of materials converts the coiled shape of the blue-green algae into miniature photocatalytic power plants which can oxidize and neutralize water pollutants. A greater region of the solar spectrum can be exploited, as the presence of zinc sulfide enables harnessing UV radiation as an energy source along with the visible part of the electromagnetic spectrum.

After the semiconductor-coated spirals have performed their water treatment task, the zinc and nickel compounds can be recovered and reused. The remaining Spirulina biomass can then be converted to bioethanol and biodiesel or processed into pellets and burned to produce energy. To form a truly circular Spirulina economy, the ashes produced by burning can serve as fertilizer to cultivate new populations.

The researchers note that the algae is relatively cheap and easy to produce, requiring only water, sunlight and fertilizer to rapidly reproduce. The Spirulina consume carbon dioxide and generate valuable oxygen as

**The combination of materials converts the coiled shape of the blue-green algae into miniature photocatalytic power plants which can oxidize and neutralize water pollutants.**

# Bulletin Board

## Curiosities

SEP. 25, 2020

a waste product in a process which improves with the addition of more CO<sub>2</sub> to the algae culture.

ingiths.globalspec.com, 13 August 2020

<https://www.ingiths.globalspec.com>

### The surprising dangers of cooking and cleaning

2020-09-10

When the Covid-19 pandemic forced global lockdowns earlier this year, one positive – if temporary – upside was a reduction in outdoor air pollution. From the [US](#) to [China](#), pollution levels dropped significantly. As countries have opened back up, however, [pollution levels have rebounded to pre-pandemic levels](#).

But this focus on outdoor air pollution overlooks a simple fact – most of our exposure to air pollution actually happens indoors. According to the Environmental Protection Agency (EPA), [the levels of indoor air pollutants can be two to five times higher](#) than outdoors – and lockdowns exacerbated that even further.

Between early March and early May 2020, Airthings, a Norway-based manufacturer of smart air-quality monitors, analysed data of their users in the US and Europe and found levels of carbon dioxide and airborne particles called volatile organic compounds (VOCs) increased by [15 to 30%](#) in more than 1,000 homes across several European countries. Similarly, [data collected by Dyson](#) of its registered air purifiers in 11 cities over four continents, found levels of VOCs and nitrogen dioxide (NO<sub>2</sub>) had risen in people's homes since lockdown.

"We spend 90% of our time indoors in developed countries, and yet all the focus, when it comes to pollution, is on the 10% of our time that we spend outdoors," says Nicola Carslaw, a professor of indoor air chemistry at the University of York. "But the vast majority of people's exposure to pollution happens indoors."

Of course, it's also worth noting that it isn't either-or: outdoor air pollution comes inside, too. And [some of the most lethal types of pollution, including nitrogen oxides and nanoparticles](#), are also the tiniest particles – minuscule enough that they can sail through not only the walls of the lungs and into the bloodstream, but around closed doors and into homes.

According to the World Health Organization (WHO), around [3.8 million people a year die](#) from the exposure to household air pollution. [Poor](#)

# Bulletin Board

## Curiosities

SEP. 25, 2020

[indoor air quality has been linked to a range of illnesses](#), including asthma, pneumonia, lung cancer, chronic obstructive pulmonary disease and cardiovascular disease.

Indoor air pollution comes from a huge range of activities. Fine particles are released from activities like cooking (frying and roasting in particular), cleaning, and from fires and candles. Around the world, [three billion people are estimated to still cook with open fires or simple stoves](#) fuelled with kerosene, coal or biomass, which produce large amounts of indoor pollution. But even using modern stoves can pose a risk.

[You are more exposed to PM2.5 \(tiny particles that are hazardous to human health when inhaled\) cooking an omelette](#) in your kitchen than standing on an average London roadside, [one study has found](#). Another study found that cooking a Sunday roast or Thanksgiving dinner could produce [higher levels of PM2.5s](#) than are found on the streets of Delhi, one of the most polluted cities in the world. These particles posed a particular risk to the respiratory system, according to Marina Vance, an environmental engineer at the University of Colorado Boulder and her colleagues who conducted the study. Surprisingly the [highest PM2.5 levels were detected when making breakfast](#).

This is why experts stress that people should always use the extractor fan or open a window when cooking. ([Read more about the hidden risks of cooking your food](#)).

We also use a lot of airborne chemicals in homes. They are embedded in the glues used in furniture as well as in paints, sealants and wood and building materials. There are also VOCs emitted from household cleaning products, personal care products like shower gels and fragrances, glues, inks and air fresheners. Individually, some VOCs are more harmful than others, although just about all react with oxides of nitrogen to create ground-level ozone.

"If you plug in an air freshener that's constantly releasing VOCs, we know that they can react indoors to form particles," says Carslaw. "If you told people they are being exposed to particles outdoors from vehicles they would get quite annoyed and probably want to avoid certain roads – but they would then happily plug in an air freshener not realising that they are also generating particles." If you must use a scented cleaning product or air freshener, she says, do so in moderation and ventilate the room.

**"But the vast majority of people's exposure to pollution happens indoors."**

# Bulletin Board

## Curiosities

SEP. 25, 2020

Vacuuming is also another source of indoor air pollution unless suitable high grade filters are used, and mopping with certain cleaning products can also increase the levels of airborne chemicals.

Other pollutants include mould spores and mould fragments resulting from damp and condensation. Combustion gases, including carbon monoxide, carbon dioxide and nitrogen oxides, are also primarily released from heating stoves and gas hobs, although candles, oil lamps and tobacco smoking also contribute these. Although gases like nitrogen dioxide also occur outside, they can accumulate at far higher concentrations indoors.

“Cooking and cleaning are two of the main sources of indoor pollution,” says Carslaw. “When you cook, you generate nitrogen oxide and particles, which are the same pollutants that you find outdoors – just a different source.”

Radon, a naturally occurring, odourless, radioactive gas can also enter a builds through the ground, or cracks in walls, and can accumulate indoors if there is inadequate ventilation. In the US, radon exposure is the leading cause of lung cancer among non-smokers.

A report last year by indoor air pollution experts Airtopia found that nearly half of UK homes have high indoor air pollution. Data from 47 homes in Birmingham, London and the Home Counties of England found a fifth of homes showed more than double the amount of safe levels of formaldehyde. And 45% of homes had significantly increased levels of VOCs – with 28% of householders in homes with high VOC readings reporting multiple respiratory difficulties.

A recent academic study conducted by researchers in Portugal assessed the air quality in homes where newborns and their mothers were living. They found that three quarters of the homes experienced PM2.5 levels in excess of limits recommended by the WHO while 41% of the homes exceeded the recommended limits for larger PM10 pollutants.

However, while indoor air pollution levels may occasionally get quite high and certain compounds can reach toxic levels, every house is different, and every person influences indoor air in different ways according to their activities and habits. That means that it varies considerably and can be even more difficult than outdoor air pollution to research.

“Outdoors we can all see what air pollution is doing day to day. Indoors, in our own homes, we just don’t know,” says Alastair Lewis, science director

# Bulletin Board

## Curiosities

SEP. 25, 2020

at the UK’s National Centre for Atmospheric Science. “In poorly ventilated homes with significant sources, concentrations of particles can be much higher indoors than outdoors.

“In our own research, looking at VOCs in homes in the UK, there can be a factor of a 1,000 difference between two homes right next door to one another.”

For reducing indoor air pollutants, experts agree that both source removal and ventilation are key.

“In most cases there are two obvious solutions to most of the sources of air pollution indoors,” says Ben Barratt, a senior lecturer in environmental exposure and public health at Imperial College, London. “One is removing the source of pollution in the first place – so using an electric cooker rather than a gas cooker. Be cautious about using cleaning products and don’t overuse them; be cautious about using candles and incense and don’t overuse them. In all cases, if you realise you are creating air pollution indoors then ventilate, open a window.”

But if you live near a busy road or in an urban centre, opening a window may only introduce more pollution indoors. In that case, experts recommend filtration via a Hepa (High Efficiency Particulate Air) filter, which can effectively remove particulates of 0.3 micrometres and larger. Still, a 0.3 micrometre particle is many times larger than nitrogen oxides or nanoparticles – so a Hepa filter isn’t a panacea.

One issue, however, is the reliability of the claims made by air purifier companies. “The thing that concerns me about these air cleaners is that they are largely unregulated,” says Carslaw. “So any company can just put one on the market and say this removes 99% of pollutants.”

To improve energy efficiency and reduce carbon emissions, many architects are moving towards more air-tight buildings. But in doing so, we should be careful not to compromise indoor air quality, say experts.

“We’ve got to be very aware that we don’t want to live in sealed boxes,” says Barratt. “With more sealed and insulated buildings, we might not have to heat them so much and we might not suffer from outdoor air pollution so much – but we do need to be aware of things like humidity, mould spores, indoor air pollution, and ensuring good ventilation.”

Already we spend 90% of our time indoors and as society shifts more towards working from home and generally spending more time indoors, the quality of our indoor air is more important than ever. There are

# Bulletin Board

## Curiosities

SEP. 25, 2020

often higher concentrations of pollutants inside our buildings than outside of them, but, alarmingly, indoor air remains largely unregulated. There clearly needs to be more public awareness about the link between indoor air quality and poor health.

bbc.com, 10 September 2020

<https://www.bbc.com>

### Iron catalysts covered in carbon graphene layer could inexpensively produce biofuels

2020-08-20

Researchers from Washington State University have taken a key first step towards economically converting plant materials into fuels. The key is to keep iron catalysts from rusting.

To create biofuels, important chemical reactions are needed to convert plant materials into fuels. Iron is an inexpensive and readily available element that could be used to create catalysts for cost-effective biofuel conversion.

Biobased fuels are expensive and have less energy density than fossil fuels. Until now, oxygen has been a hurdle in creating biobased fuels because it has to be removed before the fuel can be. Researchers wanted to use the cheapest catalyst to remove oxygen and they found that iron is an ideal choice. Iron catalysts are cheap and abundant.

But oxygen oxidizes iron, which stops the biofuel creation reaction. Researchers set out to find a way for iron to remove oxygen from plants without taking so much oxygen that it stops the reaction.

The team combined their iron catalysts with a carbon structure that was modified to incorporate nitrogen. This structure modifies properties of iron so it doesn't interact with oxygen as much while working. Nitrogen was used as a control dial to tune iron's interaction with oxygen.

The team created a durable, iron-based catalyst with a thin carbon graphene layer. The graphene layer protects the iron and cesium ions allowed the team to tailor electronic properties to create a reaction.

Researchers are currently working to better understand the chemistry of the reactions to increase the reactivity of iron catalysts. They need to test the catalysts with real feedstocks instead of the model compounds used in the study. Feedstocks are collected from farm fields and will be more

# Bulletin Board

## Curiosities

SEP. 25, 2020

complicated in composition with a lot of impurities. There is a need to integrate their catalyst into a series of steps in the conservation process.

A paper on this research was published in [ACS Catalysis](#).

website, date

<https://www.insights.globalspec.com>

### The evolution of risk

2020-09-03

Risk prevention has always been a fundamental part of business planning and operations. And while the various forms of protection available have evolved over the years, so also has risk. About 20 years ago, professional security was mostly limited to night watchmen, armored trucks and closed circuit video cameras wired to VCRs. The main entrance to all but the most secure government or sensitive facilities would encompass nothing more than a set of glass doors and perhaps a receptionist visually checking ID cards from behind a desk.

Events between 1990 and 2001 changed those ideas forever. The 1993 bombing of the World Trade Center, the Enron scandal leading to a multitude of compliance laws, the shootings at Columbine High School and ultimately the events on 9/11 ushered in a new age of security that now encompasses cybersecurity as well.

Security and life safety have always been in lockstep, as they are both fundamental needs of organizations to shield people and property from harm. Today, these two concerns are merging in an unprecedented way as the global COVID-19 pandemic is causing a paradigm shift in operations. Now it is also necessary to protect ourselves from the handles, buttons and other structural components of buildings we regularly need to touch for entry and exit.

### PROBLEMS PRESENTED AT ENTRY POINTS

The entry has always been one of the most vulnerable and critical points in a facility. Whether the concern is compliance, cybersecurity, terrorism, violence, theft or any of the hundreds of other risks facing businesses, it is of fundamental importance to secure any location where people can enter a facility.

From a security perspective, the objective is to keep any unauthorized individuals out of the building or off the campus. Further, within each

**Events between 1990 and 2001 changed those ideas forever.**

# Bulletin Board

## Curiosities

SEP. 25, 2020

building, the objective is to ensure that any individual division, area, wing or room can only be entered by those who are authorized to be in that place at that time.

securitytoday.com, 3 September 2020

<https://www.securitytoday.com>

### Why can't humans digest corn?

2020-09-13

Corn has a way of staying intact from plate to poop. The bright yellow kernels found in our favorite summer dishes can show up — seemingly undigested — in the bathroom hours later. How does corn survive the digestive system? And maybe more importantly, should you even eat a food that's hard to digest?

It turns out that your digestive system is doing more work than you think, so don't skip the maize just yet. The yellow kernels in your poo are really just the corn kernel's outer coating, according to Andrea Watson, a ruminant nutritionist at the University of Nebraska-Lincoln.

Corn kernels are seeds carrying precious genetic material. The key to the seed's survival is the waxy, yellow outer coating that protects the genetic material from weather, pests and transport. The fact that it's hard to break down is actually ideal for the plant. The outer coating owes its resilience to a tough fiber called cellulose, which humans don't have the proper enzymes or gut bacteria to digest.

#### PLAY SOUND

Even ruminant animals, such as cattle, which are much better equipped to digest cellulose, can't always fully digest corn, Watson told Live Science. While cattle don't eat the same sweet and soft corn that we do (they eat a tougher, more mature corn that can be stored long term), they, too, have whole kernels show up in their dung. Researchers have done the dirty work of picking out those expelled kernels and analyzing their nutritional content. "It turns out [the kernels] have been digested quite a bit," Watson said.

The good news is that cellulose makes up only about 10% of corn, Watson said. So, the other 90% is useful nutrition. Corn is also a good source of dietary fiber, starch and antioxidants known as carotenoids, which give vegetables such as corn and carrots their stunning colors. However, there

# Bulletin Board

## Curiosities

SEP. 25, 2020

are fewer carotenoids in corn than in a typical serving of leafy greens, according to a 2019 Tufts University report.

There's a way to make corn more digestible and disappear from your poop altogether: processing. "The more you process it, the easier it is to digest," Watson said. That's true for humans and animals alike. Grinding, wet milling, cooking — every processing step breaks down those hard to digest fiber molecules a little further, she said.

In fact, the majority of the corn you eat is processed. The Tufts University report estimates that each American consumes 160 lbs. (70 kilograms) of corn per year. The vast majority of that corn is not the hard to digest kernels nibbled off the cob, but corn that's been turned into soft tortillas, chips, popcorn and — the big one — high fructose corn syrup.

Easier to digest, however, is not to be confused with healthier. A look at the nutrition facts show common processed corn products, like corn oil and high fructose corn syrup, lose most of the beneficial fiber and nutrients during processing. Corn kernels in your poo might be odd, but they're not bad for your health. In fact, it's a sign you're eating corn in one of its healthiest forms. Watson's best advice to avoid seeing whole kernels in the bathroom: chew carefully.

*Originally published on Live Science.*

livescience.com, 13 September 2020

<https://www.livescience.com>

**And maybe more importantly, should you even eat a food that's hard to digest?**

# Bulletin Board

## Technical Notes

SEP. 25, 2020

**(NOTE: OPEN YOUR WEB BROWSER AND CLICK ON HEADING TO LINK TO SECTION)**

### CHEMICAL EFFECTS

[Aerosol, vapor, or chemicals? College student perceptions of harm from electronic cigarettes and support for a tobacco-free campus policy](#)

[Evaluating consumer exposure to disinfecting chemicals against coronavirus disease 2019 \(COVID-19\) and associated health risks](#)

[Lethal and sublethal toxicity of perfluorooctanoic acid \(PFOA\) in chronic tests with \*Hyalella azteca\* \(amphipod\) and early-life stage tests with \*Pimephales promelas\* \(fathead minnow\)](#)

### ENVIRONMENTAL RESEARCH

[Short-term effects of air pollution on cause-specific mental disorders in three subtropical Chinese cities](#)

[New directions in understanding the role of environmental contaminants in child development: Four themes](#)

[20th Pollutant Responses in Marine Organisms \(PRIMO 20\): Global issues and fundamental mechanisms caused by pollutant stress in marine and freshwater organisms](#)

### OCCUPATIONAL

[Prevalence of exposure to multiple occupational carcinogens among exposed workers in Australia](#)

[Respiratory outcomes among refinery workers exposed to inspirable alumina dust: A longitudinal study in Western Australia](#)

### PHARMACEUTICAL/TOXICOLOGY

[Drug use disorder following early life exposure to tetrachloroethylene \(PCE\)-contaminated drinking water: a retrospective cohort study](#)

[Human biomonitoring of per- and polyfluoroalkyl substances in German blood plasma samples from 1982 to 2019](#)