

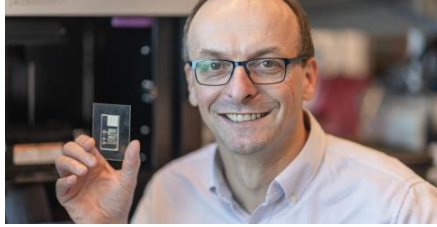
Weekly Discovery

We SHARE to inspire and ignite ideas!

11 Dec – 15 Dec 2023

3D PRINTING

Made-To-Order Diagnostic Tests May Be on The Horizon



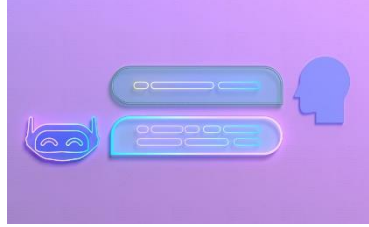
"McGill University researchers have made a breakthrough in diagnostic technology, inventing a 'lab on a chip' that can be 3D-printed in just 30 minutes. The chip has the potential to make on-the-spot testing widely accessible.

As part of a recent study, the results of which were published in the journal *Advanced Materials*, the McGill team developed capillary chips that act as miniature laboratories. Unlike other computer microprocessors, these chips are single-use and require no external power source—a simple paper strip suffices. They function through capillary action – the very phenomena by which a spilled liquid on the kitchen table spontaneously wicks into the paper towel used to wipe it up."

Source: [McGill](#) (29 Nov 2023)

AI

Artificial Intelligence Systems Excel at Imitation, But Not Innovation



"Artificial intelligence (AI) systems are often depicted as sentient agents poised to overshadow the human mind. But AI lacks the crucial human ability of innovation, according to findings published in *Perspectives on Psychological Science*.

While children and adults alike can solve problems by finding novel uses for everyday objects, AI systems often lack the ability to view tools in a new way, researchers at the University of California, Berkeley concluded.

AI language models like ChatGPT are passively trained on data sets containing billions of words and images produced by humans. This allows AI systems to function as a "cultural technology" similar to writing that can summarize existing knowledge, Eunice Yiu, a co-author of the article, explained in an interview. But unlike humans, they struggle when it comes to innovating on these ideas, she said.

"Even young human children can produce intelligent responses to certain questions that [language learning models] cannot," Yiu said. "Instead of viewing these AI systems as intelligent agents like ourselves, we can think of them as a new form of library or search engine. They effectively summarize and communicate the existing culture and knowledge base to us."

Source: [APS](#) (12 Dec 2023)

AI

Creativity In the Age of Generative AI: A New Era of Creative Partnerships



"In a new paper in a *Nature Human Behavior* special issue on AI, researcher Janet Rafner from Aarhus Institute of Advanced Studies and Center for Hybrid Intelligence at Aarhus University and Prof. Jacob Sherson, Director of the Center for Hybrid Intelligence, together with international collaborators discuss research and societal implications of creativity and artificial intelligence (AI).

Recent advancements in generative AI have showcased its potential in a wide range of creative activities such as to produce works of art, compose symphonies, and even draft legal texts, slide presentations or the like. These developments have raised concerns that AI will outperform humans in creativity tasks and make knowledge workers redundant. These comments are most recently underlined by a *Fortune* article entitled 'Elon Musk says AI will create a future where 'no job is needed': 'The AI will be able to do everything'. In contrast, corresponding author Jacob Sherson puts it: "Autonomous AI will certainly continue to astound us. However, such technologies in the hands of business professionals and other experts will offer endless avenues of innovative potential, so there is not going to be a shortage of jobs."

Source: [AIAS](#) (17 Nov 2023)

AI HEALTHCARE

AI Chatbot Shows Potential as Diagnostic Partner, Researchers Find



"Physician-investigators at Beth Israel Deaconess Medical Center (BIDMC) compared a chatbot's probabilistic reasoning to that of human clinicians. The findings, published in *JAMA Network Open*, suggest that artificial intelligence could serve as useful clinical decision support tools for physicians.

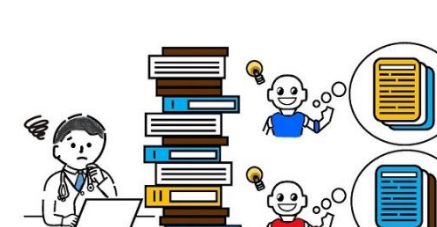
"Humans struggle with probabilistic reasoning, the practice of making decisions based on calculating odds," said the study's corresponding author Adam Rodman, MD, an internal medicine physician and investigator in the department of Medicine at BIDMC. "Probabilistic reasoning is one of several components of making a diagnosis, which is an incredibly complex process that uses a variety of different cognitive strategies. We chose to evaluate probabilistic reasoning in isolation because it is a well-known area where humans could use support."

Basing their study on a previously published national survey of more than 550 practitioners performing probabilistic reasoning on five medical cases, Rodman and colleagues fed the publicly available Large Language Model (LLM), Chat GPT-4, the same series of cases and ran an identical prompt 100 times to generate a range of responses."

Source: [BIDMC](#) (11 Dec 2023)

AI RESEARCH

Battle Of the Ais in Medical Research: ChatGPT Vs Elicit



"Can AI save us from the arduous and time-consuming task of academic research collection? An international team of researchers investigated the credibility and efficiency of generative AI as an information-gathering tool in the medical field.

The research team, led by Professor Masaru Enomoto of the Graduate School of Medicine at Osaka Metropolitan University, fed identical clinical questions and literature selection criteria to two generative AIs; ChatGPT and Elicit. The results showed that while ChatGPT suggested fictitious articles, Elicit was efficient, suggesting multiple references within a few minutes with the same level of accuracy as the researchers.

"This research was conceived out of our experience with managing vast amounts of medical literature over long periods of time. Access to information using generative AI is still in its infancy, so we need to exercise caution as the current information is not accurate or up-to-date." Said Dr. Enomoto. "However, ChatGPT and other generative AIs are constantly evolving and are expected to revolutionize the field of medical research in the future.

Their findings were published in [Hepatology Communications](#)."

Source: [OMU](#) (8 Dec 2023)

URBAN PLANNING

The Configuration of Green Spaces in Cities Determines the Characteristics of Their Birds



"The University of Granada has taken part in an international study that analysed the distribution of 115 species of birds in spring and 72 that spend the winter in different cities.

The study provides information on how to design urban areas that favour biodiversity and public wellbeing.

An international team including researchers from the University of Granada (UGR) and the National Museum of Natural Sciences (MNCN-CSIC) has studied the distribution of 115 species of birds in spring and 72 that spend the winter in nine European cities.

They concluded that the configuration of urban areas can favour the presence of species with varying characteristics, with implications for the improvement of ecosystems and public health. The article, published in the journal *Science of the Total Environment*, proposes actions to promote the creation of cities that are not only more habitable for birds, but also more liveable for citizens."

Source: [UGR](#) (12 Dec 2023)

LIGHT POLLUTION

Study: Light Pollution Is Luring Birds to Cities – And Sometimes to Their Deaths



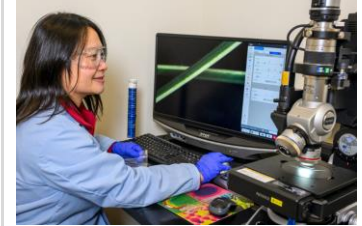
"Nearly 1,000 birds were killed in a single night in October when they collided with an illuminated glass building in Chicago. Though mass fatalities of this magnitude are rare, light pollution poses a serious – and growing – threat to migrating birds.

In the largest study of its kind, published in *Nature Communications*, scientists used weather radar data to map bird stopover density in the United States and found that artificial light is a top indicator of where birds will land. City lights lure birds into what can be an ecological trap, said lead author Kyle Horton, an assistant professor in Colorado State University's Department of Fish, Wildlife and Conservation Biology."

Source: [CSU](#) (4 Dec 2023)

MATERIALS

New Conductive, Cotton-Based Fiber Developed for Smart Textiles



"A single strand of fiber developed at Washington State University has the flexibility of cotton and the electric conductivity of a polymer, called polyaniline.

The newly developed material showed good potential for wearable e-textiles. The WSU researchers tested the fibers with a system that powered an LED light and another that sensed ammonia gas, detailing their findings in the journal *Carbohydrate Polymers*.

"We have one fiber in two sections: one section is the conventional cotton: flexible and strong enough for everyday use, and the other side is the conductive material," said Hang Liu, WSU textile researcher and the study's corresponding author. "The cotton can support the conductive material which can provide the needed function."

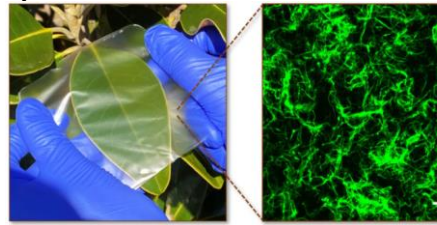
While more development is needed, the idea is to integrate fibers like these into apparel as sensor patches with flexible circuits. These patches could be part of uniforms for firefighters, soldiers or workers who handle chemicals to detect for hazardous exposures. Other applications include health monitoring or exercise shirts that can do more than current fitness monitors.

"We have some smart wearables, like smart watches, that can track your movement and human vital signs, but we hope that in the future your everyday clothing can do these functions as well," said Liu. "Fashion is not just color and style, as a lot of people think about it: fashion is science."

Source: [WSU INSIDER](#) (22 Nov 2023)

MATERIALS

Researchers Combine Biopolymers Derived from The Ocean to Replace Synthetic Plastic Films

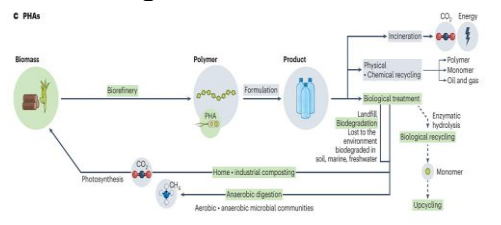


"Materials with enhanced structure derived from crustaceans and seaweed could be part of a next-generation answer to the challenge of replacing petroleum-based plastic films, according to new research from North Carolina State University.

Combining chitosan, a biopolymer that makes crab shells hard, with agarose, a biopolymer extracted from seaweed that is used to make gels, creates unique biopolymer composite films with enhanced strength. The films are also biodegradable, have antibacterial properties, repel water and are transparent. The findings

MATERIALS

KAIST Introduces Eco-Friendly Technologies for Plastic Production and Biodegradation



"Plastic is one of the important materials in modern society, with approximately 460 million tons produced annually and with expected production reaching approximately 1.23 billion tons in 2060. However, since 1950, plastic waste totaling more than 6.3 billion tons has been generated, and it is believed that more than 140 million tons of plastic waste has accumulated in the aquatic environment. Recently, the seriousness of microplastic pollution has emerged, not only posing a risk to the marine ecosystem and human health, but also worsening global warming by inhibiting the activity of marine plankton, which play an

MACHINE LEARNING

Using Machine Learning to Monitor Driver 'Workload' Could Help Improve Road Safety



"The researchers, from the University of Cambridge, working in partnership with Jaguar Land Rover (JLR) used a combination of on-road experiments and machine learning as well as Bayesian filtering techniques to reliably and continuously measure driver 'workload'. Driving in an unfamiliar area may translate to a high workload, while a daily commute may mean a lower workload.

The resulting algorithm is highly adaptable and can respond in near real-time to changes in the driver's behaviour and status, road conditions, road type, or driver characteristics.

FAKE NEWS

Psychological Science Can Help Counter Spread of Misinformation, Says APA Report



"Debunking, "prebunking," nudging and teaching digital literacy are several of the more effective ways to counter misinformation, according to a new report from the American Psychological Association.

Written by a panel of U.S. and international experts on the psychology of misinformation, the report outlines the processes that make people susceptible to misinformation and offers solutions to combat it.

People are more likely to believe misinformation if it comes from groups they belong to or if they judge the source as credible, according to the report ["Using Psychological Science to](#)

could eventually lead to sustainable packaging films for food and consumer goods.

"How do we find sustainable replacements for synthetic polymers?" asked Orlin Velev, S. Frank and Doris Culberson Distinguished Professor of Chemical and Biomolecular Engineering at NC State and corresponding author of a paper describing the research. "Synthetic polymers make very good films, but we want to replace them with natural biopolymers. The question becomes how do we adjust the joint structure of these natural polymers – in our case, agarose and chitosan – so we can have all the desirable properties of synthetic polymers inside a sustainable, biodegradable film?"

Source: [NCSU](#) (11 Dec 2023)

important role in lowering the Earth's carbon dioxide concentration.

KAIST President Kwang-Hyung Lee announced on December 11 that a research team under Distinguished Professor Sang Yup Lee of the Department of Chemical and Biomolecular Engineering had published a paper titled 'Sustainable production and degradation of plastics using microbes', which covers the latest technologies for producing plastics and processing waste plastics in an eco-friendly manner using microorganisms...

Microorganisms have the ability to naturally produce or decompose certain compounds, and this ability is maximized through biotechnologies such as metabolic engineering and enzyme engineering to produce plastics from renewable biomass resources instead of fossil raw materials and to decompose waste plastics."

Source: [KAIST](#) (11 Dec 2023)

This information could then be incorporated into in-vehicle systems such as infotainment and navigation, displays, advanced driver assistance systems (ADAS) and others. Any driver-vehicle interaction can be then customised to prioritise safety and enhance the user experience, delivering adaptive human-machine interactions. For example, drivers are only alerted at times of low workload, so that the driver can keep their full concentration on the road in more stressful driving scenarios. The results are reported in the journal IEEE Transactions on Intelligent Vehicles."

Source: [CAMBRIDGE](#) (7 Dec 2023)

[Understand and Fight Health Misinformation: An APA Consensus Statement \(PDF, 1.75MB\).](#)" It defines misinformation as "any information that is demonstrably false or otherwise misleading, regardless of its source or intention.

The report outlines the key features of misinformation that fool people into believing and spreading it. For instance, it found that people are more likely to believe false statements that appeal to emotions such as fear and outrage. They are also more likely to believe misinformation that paints groups that they view as "others" in a negative light. And people are more likely to believe information the more it is repeated, even when it contradicts their prior knowledge. These findings suggest that it is important to stop misinformation early, the report says.

The report also describes features of social media that help misinformation spread very quickly. "Rapid publication and peer-to-peer sharing allow ordinary users to distribute information quickly to large audiences, so misinformation can be policed only after the fact (if at all)," the report says. "'Echo chambers' bind and isolate online communities with similar views, which aids the spread of falsehoods and impedes the spread of factual corrections."

Source: [APA](#) (29 Nov 2023)

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