NEWSLETTER

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"The Best Time To Plant A Tree It Was 20 Years Ago. The Next Best Time Is Today"

Chinese Proverb

CEMENT AS A CLIMATE KILLER : Using industrial waste to produce carbon neutral alternatives

Published on MAY 20, 2019 ,PHYS.ORG | by Martin-Luther-Universität Halle-Wittenberg

Producing cement takes a heavy toll on our climate: Around eight per cent of annual global carbon dioxide emissions can be attributed to this process. However, the demand for cement continues to rise. A team of geoscientists from Martin Luther University Halle-Wittenberg (MLU) has found a way to produce more environmentally friendly and sustainable alternatives. In the journal *Construction and Building Materials* they describe how industrial residues can be used to produce high-quality, climate-friendly materials.

The basic raw material for cement is limestone, which is converted to cement clinker in large furnaces. The environmental impact of this process is disastrous: "Around one tonne of carbon dioxide is released during cement production for every tonne of limestone. The majority of this is emitted by the limestone itself," says Professor Herbert Pöllmann, a geoscientist at MLU. Replacing the limestone in cement production would result in an enormous savings potential, adds the researcher. However, the material produced would need to have the same beneficial properties as traditional cement.

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In their search for alternative raw materials, the researchers from Halle came across two types of industrial waste: Residual materials from the production of kaolin and aluminium. "I don't really like the term industrial waste. It is actually industrial residues that can still be used very effectively, for example to produce alternative forms of cement," says Pöllmann. For the new study, his team tested different mixing ratios and analysed the physical properties of the newly produced cements. The study showed that the two industrial residues can be used to produce cements that have the same properties as conventional mixtures.

The advantage of the two residual materials that the mineralogists at MLU investigated is that they contain no carbon dioxide which could be released during further processing. "And you can use them to produce large quantities of cement that has great properties," explains Pöllmann. In the new study, he and his team also describe in detail the mixing ratios and production steps of the more environmentally friendly cements. According to the researcher, producers could either switch completely to the more climate-friendly materials or produce cement mixtures that use a lower ratio of limestone and are therefore also more climate-friendly.
However, the process does have its limits: "There aren't enough industrial residues to cover the global demand for cement," says Pöllmann. Therefore, his team is also looking for suitable natural products such as volcanic ash or various mineral resources that have not yet been used industrially and that do not release carbon dioxide as well, for example various types of clay.

Employee Profile

Everyone, Meet **Ms Phuah**

Account / Admin Executive

Joining NRS on 2017. Other than shopping and watching movies, she loves travelling. What else single young lady love to do, am I right? As long as it keep her happy go lucky .She surprised us when she said she loves to drink plain water, in fact she never include it in her daily lunch menu. ;-D Anyway she's coffee lover and she doesn't like red bean at all.

Scanning Your Eyes for Alzheimer's

Gates/Bezos-funded charity champions research into methods for early detection of Alzheimer's disease

By Megan Scudellari - *IEEE Spectrum*.

The Alzheimer's Drug Discovery Foundation (ADDF) just announced the first award recipients of their $50 million Diagnostics Accelerator research program, an initiative funded by Bill Gates, Jeff and MacKenzie Bezos, and former Estée Lauder CEO Leonard Lauder, among others.

The four recipients, chosen from a pool of 300 applicants across 30 countries, are developing reliable, cost-effective ways to diagnose Alzheimer's disease, including one that will use machine learning to detect early signs of concern through an eye scan.
"Unlike heart disease and cancer, we lack simple and cost-effective diagnostic tools and biomarkers that are critical to finding ways to prevent and treat Alzheimer's disease," said ADDF chief scientific officer Howard Fillit in a press release. "Once we have them, we will better understand how Alzheimer's progresses and make clinical drug trials more efficient and rigorous."

Current tests to diagnose Alzheimer's disease (AD) are expensive, often invasive, and catch the disease only after symptoms have emerged. These tests include cognitive evaluations, such as memorization exercises; neuroimaging via costly PET and MRI scans; and measuring levels of Alzheimer's associated proteins, amyloid beta and tau, in the cerebral spinal fluid.

In contrast to those existing options, the ADDF winners want to make tests that are less expensive, portable, and detect AD far earlier in life. At the University of Edinburgh in Scotland, Tom MacGillivray received $488,997 to develop a comprehensive eye scan system analyzing multiple biomarkers in the eye to detect brain degeneration. "We can look inside the human body through the natural window of the retina," he told *IEEE Spectrum*.

The comprehensive scanning procedure, including image analysis software with machine learning components, would analyze images from eye-scanning equipment that's already available in optician offices (and is far less expensive than MRI or PET machines). Working with Sharon Fekrat at Duke University, MacGillivray will measure changes in small blood vessels at the back of the eye and changes in layers of nerve tissue which have been associated with AD.
"Some of these changes in the eye might predate some of the serious cognitive decline symptoms that present later on in the disease," says MacGillivray. If such changes can be detected early, then it might be possible to intervene early and test out new preventative drugs, he adds.

An image of the retina from an ultra-widefield scanning laser ophthalmoscope tracks the branching patterns of small blood vessels.

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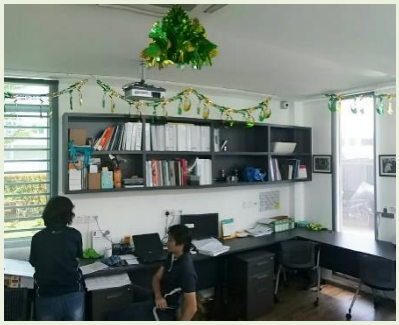

…behind the scene