



10 BREAKTHROUGH TECHNOLOGIES OF THE YEAR

Bill Gates told MIT Technology Review about 10 breakthrough technologies 2019.

Since 2002, MIT Technology Review has been publishing the annual list of ten cutting-edge technologies that will impact the future development of humanity. This year's list was for the first time compiled by a guest editor, Bill Gates, one of the founders of Microsoft.

FUSION REACTORS ARE STILL UNDER DEVELOPMENT, WITH THE LAUNCH SLATED FOR 2030, WHILE MOBILE SMR REACTORS HAVE ALREADY BECOME A REALITY. BILL GATES IS AN INVESTOR IN TWO COMPANIES SPECIALISED IN THIS FIELD – TERRAPOWERS AND COMMONWEALTH FUSION SYSTEMS.

According to Gates, all the developments fall into three categories: climate change mitigation, healthcare and artificial intelligence (AI). Some of them have already entered the market, while others are still at the preparatory stages.

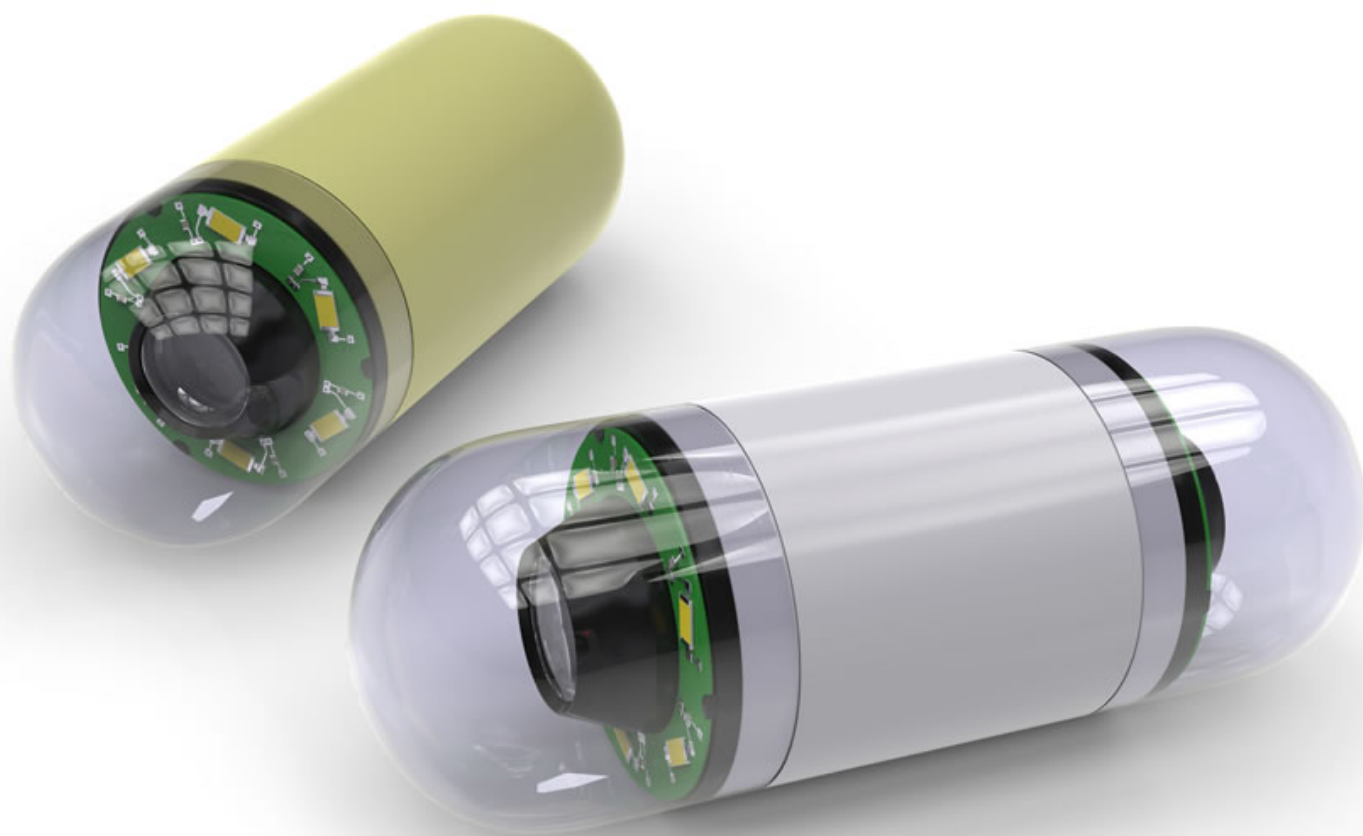
1. Robot dexterity. Most often, industrial robots are clumsy and inflexible. They cannot figure out how to grasp any object just by looking at it, as people do. That is why they learn through virtual trial and error. One such project is Dactyl, a robot hand from OpenAI using neural network software and surrounded by an array of sensors, lights, and cameras. Now engineers teach it how to handle objects of different shapes and sizes.

2. New-wave nuclear power. Generation IV fission reactors, which have long been talked about by physicists, will become eco-friendlier and cheaper. Researchers are planning not only to miniaturise them, but also to develop new types. Fusion reactors are still under development, with the launch slated for 2030, while mobile SMR reactors have already become a reality. Bill Gates is an investor in two companies specialised in this field – TerraPower and Commonwealth Fusion Systems.

3. Predicting preemies. A simple blood test can predict if a pregnant woman is at risk of giving birth prematurely. This research is carried out by Stephen Quake, a bioengineer at Stanford, and Akna Dx. Quake's test will cost less than USD 10 a measurement and will save many lives. Doctors will be able to monitor women likely to deliver too early and stave off an early birth.



4. Gut probe in a pill. A small, swallowable device captures detailed images of the gut without anaesthesia. Such a device has been developed by Guillermo Tearney, MD, PhD, a pathologist at the Massachusetts General Hospital. Its pilot testing is planned for 2019. Tearney's swallowable capsule can change the approach to diagnosing digestive tract diseases in poor countries, where many people suffer due to the lack of necessary equipment.



BEYOND MEAT AND IMPOSSIBLE FOODS USE PEA, SOY, WHEAT, POTATOES, AND VEGETABLE OIL PROTEINS TO MIMIC THE TEXTURE AND TASTE OF ANIMAL MEAT.

5. Custom cancer vaccines. A start-up called BioNTech develops the world's first personalised cancer vaccine. In 2017, the company began a test of the vaccine in collaboration with Genentech. The procedure triggers a person's immune system to identify a tumour by its unique mutations and can effectively shut down many types of cancers. Researchers have already provided evidence that a vaccine containing copies of the mutations inherent in a particular cancer cell can catalyse the body's immune system to produce cytotoxic T cells primed to seek out, attack, and destroy cancer cells with certain mutations.

6. The cow-free burger. The UN expects the world to have 9.8 bn people by 2050. People get richer, live longer, and tend to eat more meat, thus causing a devastating impact on the environment. Scientists suggest making lab-grown and plant-based meats. Gates is an investor in two companies operating in this market – Beyond Meat and Impossible Foods, which use pea, soy, wheat, potatoes, and vegetable oil proteins to mimic the texture and taste of animal meat.



7. Carbon dioxide catcher. Catastrophic climate change has urged scientists to create technologies that will help capture carbon dioxide from the air and use it in fuels. Previously, this way of fighting for clean air had been considered too expensive, until Harvard climate scientist David Keith calculated that machines could pull CO₂ off for less than USD 100 a ton. In 2009, Keith co-founded Carbon Engineering, a start-up, in which Gates is an investor, as he believes that the initiative can change the approach to environmental protection and stop climate change.

8. An ECG on your wrist. An ECG is often used not only to monitor your health, but also diagnose abnormalities before they cause a stroke or heart attack. However, it requires a visit to a clinic, and for many people delay may be fatal. Wearable smart devices make the procedure incredibly simple. To this end, in 2017 AliveCor, a Silicon Valley start-up, released an Apple Watch-compatible band that can monitor the heart and detect abnormalities. Last year, Apple introduced a similar technology of its own.



NEW DIGITAL WILL BE ABLE TO LEARN MUCH FASTER AND BECOME MUCH MORE "HUMAN".

9. Sanitation without sewers. In his Annual Letter, Gates highlighted that today over 2.3 bn people lack access to a decent toilet. This causes outbreaks of deadly diseases, including cholera. Back in 2011, Gates established the Reinvent the Toilet Challenge. He encouraged researchers and inventors to create innovative and inexpensive toilets that would solve this problem. NEWgenerator and Biomass Controls start-ups have already presented their projects. So far, however, no company has been able to find a solution. The projects are either too expensive or unsuitable for villages.

10. Smooth-talking AI assistants. People are used to AI assistants, but they have a serious disadvantage: unlike people, they cannot understand a sentence. New digital assistants will master this skill and will no longer look like robots. They will be able to learn much faster and become much more "human".



Source: <https://incrussia.ru> (<https://incrussia.ru>)

SIBUR © SIBUR Holding PJSC, 2024

Design and programming: LudiPeople www.vashagazeta.com (www.vashagazeta.com)
e-mail: dearcustomer@sibur.ru (<mailto:dearcustomer@sibur.ru>)

+16