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Future Insight Prize of € 1 Million Awarded to Tobias Erb for Carbon Dioxide Fixation and Conversion

- **Prizewinner from the Max Planck Institute in Marburg, Germany is working on capturing carbon dioxide and converting it into new chemical building blocks using biocatalysts**
- **Future Insight Prize 2023 to be awarded for early pandemic detection**
- **Johann Anton Merck Award presented to Stephen Jackson, University of Cambridge, UK**

Darmstadt, Germany, July 13, 2022– Merck KGaA, Darmstadt, Germany, a leading science and technology company, today today announced the winner of the 2022 Future Insight Prize in the category of “Energy”. The € 1 million prize was awarded at the “[Curious2022 – Future Insight](#)” scientific conference in Darmstadt, Germany, to Professor Tobias Erb (43), Director at the Max Planck Institute for Terrestrial Microbiology in Marburg, Germany. Using synthetic biology, his research group discovers and combines biocatalysts to enable more efficient carbon dioxide (CO₂) fixation. These new-to-nature solutions make it possible to convert CO₂ into valuable chemical products, which in turn, be used as feedstock for fuel.

“Science and technology hold the keys for society to accelerate its ability to improve the health of humanity and our planet. Tobias Erb has re-engineered photosynthesis to provide humanity with efficient capturing and conversion of carbon dioxide into useful products,” said Belén Garijo, Chair of the Executive Board and CEO of Merck KGaA, Darmstadt, Germany. “He is a perfect recipient of the Future Insight Prize,



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and we hope this award will further accelerate the commercialization and adoption of his discoveries.”

Bettina Stark-Watzinger, German Federal Minister of Education and Research, commented: “With the Future Insight Prize, Merck KGaA, Darmstadt, Germany honors outstanding science in a special way. The prize winners stand for innovative research and successful transfer. With their work, they make important contributions to solving the pressing questions of our time. The prize money could hardly be better invested than in the future research of these bright minds.”

Upon receiving the award, Tobias Erb said, “Our fundamental long-term research approach has started bearing fruit. My research team currently aims to deploy our technology in different setups to unlock the full potential of synthetic CO₂ fixation”. “Research in our lab interfaces biology and chemistry and centers on the discovery, function and engineering of novel carbon-dioxide-converting enzymes and their further use in engineered and artificial photosynthesis. In doing so, we aim to provide novel solutions for improved carbon capture in biotechnology, agriculture and synthetic chemistry,” he continued.

[Tobias Erb](#)’s project on carbon dioxide fixation and the creation of new solutions has already led to numerous breakthroughs. His team discovered a novel class of CO₂-fixing enzymes, enoyl-CoA carboxylases/reductases (ECRs), which are the most efficient CO₂-converting biocatalysts known to date. The group also demonstrated that CO₂ can be directly converted into pentadecane, a prime component of diesel fuel, as well as into a polyketide that acts as a precursor to an antibiotic drug. Using a “metabolic retrosynthesis” approach, Erb’s research team designed and realized artificial CO₂-fixation pathways that are more efficient than natural photosynthesis. The group is currently focusing on implementing these synthetic pathways in living cells, while simultaneously making progress with the construction of artificial systems that enable more efficient light-driven capture of CO₂ than their natural evolved counterparts.

This year’s Future Insight Prize is being awarded against the backdrop of rising carbon dioxide levels in the atmosphere. Atmospheric carbon dioxide is the main carbon source for life on Earth. Its concentration in the Earth’s pre-industrial

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atmosphere was regulated by, among other things, photosynthetic organisms. Due to human activities the concentration of carbon dioxide in the Earth's atmosphere has risen. Currently, about half of the carbon dioxide released from the burning of fossil fuels remains in the atmosphere and is not absorbed by vegetation or the oceans. Increases in atmospheric concentrations of carbon dioxide and other long-lived greenhouse gases have strengthened their absorption and emission of infrared radiation, causing the rise in average global temperature since the mid-20th century.

A schematic and graphic depiction of the prizewinning work can be found [here](#). The winner of the Future Insight Prize is selected by a jury comprising more than 80 renowned top scientists from different research fields – including many Nobel laureates. Merck KGaA, Darmstadt, Germany first announced the Future Insight Prize in 2018. It is intended to recognize outstanding scientists who are making meaningful contributions to fields that are critical to the future of humanity. In 2019, the very first winners were [Pardis Sabeti](#) from Harvard University and the Broad Institute, Cambridge, Massachusetts, USA, and [James Crowe](#) from Vanderbilt University Medical Center, Nashville, Tennessee, USA, for their research in the area of pandemic protection. The following year, [Stephan Sieber](#) from the Technical University of Munich, Germany, received the award for his project on a multi-drug resistance breaker. The 2021 winners [Ting Lu](#) from University of Illinois Urbana-Champaign, USA, and [Stephen Techtmann](#) from Michigan Technological University, USA, were recognized for their joint research on the conversion of plastic waste into edible foods. Next year's Future Insight Prize will be awarded for an early warning system to constantly monitor circulating bacteria and viruses in order to detect newly emerging pandemics. Proposals are welcome and can be submitted [here](#) until Dec 31, 2022.

Yesterday, the Curious2022 – Future Insight conference presented the € 30,000 [Johann Anton Merck Award](#) to Stephen Jackson, Professor of Biology at the University of Cambridge and Head of Cancer Research UK Laboratories, Gurdon Institute, Cambridge, UK. He conducted pioneering research on DNA Damage Response (DDR) and his DDR drug targets have led to a new oncology therapy paradigm by harnessing the synthetic-lethality principle. Besides many other achievements, Jackson founded KuDOS Pharmaceuticals, the company that discovered the first poly ADP ribose polymerase, (PARP) inhibitor olaparib.

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The company holds the global rights to the name and trademark "Merck" internationally. The only exceptions are the United States and Canada, where the business sectors of Merck KGaA, Darmstadt, Germany, operate as MilliporeSigma in life science, EMD Serono in healthcare and EMD Electronics in electronics. Since its founding in 1668, scientific exploration and responsible entrepreneurship have been key to the company's technological and scientific advances. To this day, the founding family remains the majority owner of the publicly listed company.