Lockheed Martin Is Reprogramming Cells To Bioproduce New Materials

$10 Million Army Research Contract Advances Precision Biodesign

PALO ALTO, Calif., Feb. 26, 2019 /PRNewswire/ -- Cells form the cornerstone of life, and Lockheed Martin (NYSE: LMT) is researching ways to create the building blocks of novel materials. In a new cooperative agreement with the Army Research Laboratory, Lockheed Martin material scientists will work with industry and Army scientists who design microbes to edit single-cell organism DNA. They will investigate a range of capabilities, particularly those that can improve defense optical technology and coatings.

"Cells efficiently create all sorts of materials, like a spider's silk or a butterfly's iridescent wings. We want to harness nature's process to better protect people," said Melissa Rhoads, senior research manager and Lockheed Martin lead for the project. "Biodesign exists today, but it doesn't exist at the scale and to the quality of defense standards."

Biology and technology intersect in the field of biodesign. Some fashion houses even use the sustainable technology to develop fabrics for clothing, but Lockheed Martin's Advanced Technology Center sees potential to mature the science to a more precise level. This maturation requires collaboration between ARL and Lockheed Martin and leverages commercial advances from companies such as Ginkgo Bioworks.

Scientists often look to nature to provide inspiration, and those ideas can help lower the cost of optical technologies. For example, telescopes use lenses to filter out unwanted light or to get a clearer image. However, a squid lens is able to filter and focus light in compact package due to molecule-based design and varied refractive index. In another example, melanin protects humans and animals alike from the Sun's UV rays. So melanin—or similar molecules with protective functions—could be another natural substance attracting the study's attention.

"We can't manufacture that kind of capability, so Lockheed Martin will try nature's way," Rhoads said. "Harnessing the power of self-assembling materials is sustainable, affordable and can be much faster to produce than artificial methods. As much potential there is for biodesign, the maturity of the materials technology is still low, so our five-year study will advance this field significantly for precision science."

The $10 million, five-year agreement uses the name Self-Assembly of Nanostructures for Tunable Materials and will leverage the Army's Open Campus model to enable collaboration between university, small-business, Army and Lockheed Martin scientists and engineers. Partnerships across industry and government groups have grown from programs like the National Science Foundation's SynBERC and the Department of Defense's Applied Research for Advancement of Science and Technology Priorities.

About Lockheed Martin

Headquartered in Bethesda, Maryland, Lockheed Martin is a global security and aerospace company that employs approximately 105,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services.

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