

A wise tool for modifying microbes

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ORNL's Adam Guss began adapting the SAGE gene editing tool to modify microbes in graduate school. Today, SAGE is rapidly accelerating the design of custom microbes for a variety of applications. Credit: Carlos Jones/ORNL, U.S. Dept. of Energy

A DNA editing tool adapted by Oak Ridge National Laboratory scientists makes engineering microbes for everything from bioenergy

production to plastics recycling easier and faster.

The Serine recombinase-Assisted Genome Engineering, or SAGE system, lets scientists quickly insert and test new DNA designs in a variety of microorganisms. Engineered [microbes](#) hold promise for making biofuels, recycling mixed plastics, aiding soil carbon storage and treating health disorders. The research is published in the journal *Science Advances*.

"SAGE works in virtually all microorganisms, revolutionizing what we're able to do with microbes," said ORNL's Adam Guss. Microbes were modified in a few days with SAGE, compared with a tailoring process that can take weeks using existing methods.

SAGE can advance fundamental biology as well as bioengineering, Guss said. "As a national lab, enabling science everywhere is part of our mission. SAGE is a tool that can speed the work of industry and [academic researchers](#) in their own organisms of interest."

More information: Joshua R. Elmore et al, High-throughput genetic engineering of nonmodel and undomesticated bacteria via iterative site-specific genome integration, *Science Advances* (2023). [DOI: 10.1126/sciadv.ade1285](#)

Provided by Oak Ridge National Laboratory

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