

## Bold new directions for synthetic biology

Armed with powerful new genetic tools and a penchant for tinkering, synthetic biologists have built a new menagerie.

Photographic “*E. coli*roid” darken in response to light. Sensor bacteria record the presence of a chemical in a mouse’s gut by turning on certain genes. There are strains of *E. coli* that count input signals and others that carry out logical operations—steps toward biological computers. Still other strains smell like wintergreen and bananas instead of like the human gut.

In 2005, festive researchers “wrote” the first verse of Viktor Rydberg’s Christmas poem “Tomten” into the genome of yet another *E. coli* strain, using triplets of DNA nucleotides to represent each letter; the resulting bacterium, they wrote, was “the first example of an organism that ‘recites’ poetry.”

Insofar as a common theme unites these diverse creations, it is the transformation of biology into an engineering discipline. Traditional genetic engineering amounted more or less to biological cut-and-paste: scientists could, for instance, transfer a cold-tolerance gene from an Arctic fish into a tomato. Synthetic biology aims for a more radical reorganization.

Its organisms are built to be biological machines, with DNA and proteins standing in for circuit components or lines of computer code. In combination, the biological parts perform functions unknown to nature: processing signals, producing new chemicals, storing information.

**Read the full, original story: [Synthetic biology’s new menagerie](#)**