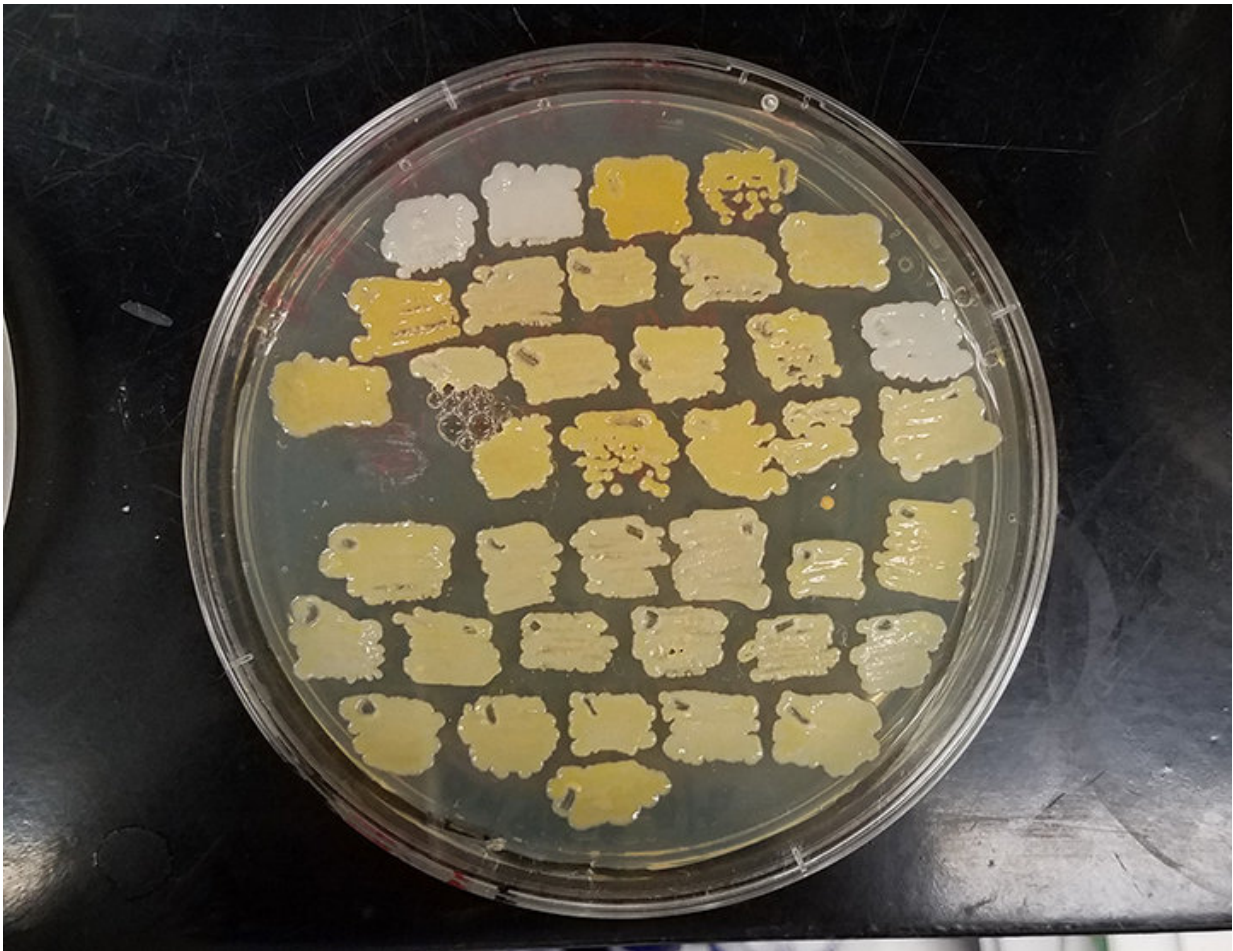


Scientists explore new experimental model systems to advance biology

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Marine protists known as thraustochytrids produce carotenoids, which are responsible for giving them a yellow to orange color. Carotenoids are essential nutrients for animals, and of biotechnological interest for several applications. EMS scientists are using genetic tools to test whether a novel thraustochytrid gene is involved in carotenoid biosynthesis. What results from

the genetic manipulation is the white colonies on these plates – a possible indication of the phenotype of carotenoid-less thraustochytrids that results when the novel gene is inactivated. Credit: Mariana Rius

Tremendous advancement of basic biological knowledge has come from genetically manipulating model organisms to test mechanistic hypotheses. But the selection of traditional model organisms available offers a limited view of biological diversity, meaning that they cannot be used to investigate a broad swath of novel and important processes. Now an international team of scientists including Jackie Collier, Ph.D., an Associate Professor in the School of Marine and Atmospheric Sciences (SoMAS) at Stony Brook University, is investigating how to genetically manipulate a variety of marine protists – unicellular microscopic organisms that are not classified as a plant, animal or fungus – to develop new experimental models that may help to advance scientific understanding in oceanography and other areas of the biological sciences.

The initiative, launched in 2015, is called the Experimental Model Systems (EMS) Program. A paper describing the diversity and implications of these new [model](#) systems, and the unusual collaborative approach of the EMS program, is now published in *PLOS Biology*.

"Our group created new tools to genetically manipulate a variety of marine protists," said Collier. "These protists comprise a very diverse group of single-cell eukaryotes that are major components of marine ecosystems and food webs – including the phytoplankton that perform about half of the photosynthesis in the oceans and cause problems in coastal systems such as [harmful algal blooms](#) like brown tide – and because of this we may be able to discover new insights into basic biology with broad ecological implications."

According to the authors, the "EMS program has ignited new drive, progress, and resources to overcome what many in the field of marine protistology, ecology, and oceanography have recognized as a significant obstacle to understanding these complex and important biological systems."

More information: Ross F. Waller et al. Strength in numbers: Collaborative science for new experimental model systems, *PLOS Biology* (2018). [DOI: 10.1371/journal.pbio.2006333](https://doi.org/10.1371/journal.pbio.2006333)

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