

Study on bacteria-invading virus yields new discoveries

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Innovative work by two Florida State University scientists that shows the structural and DNA breakdown of a bacteria-invading virus is being featured on the cover of the February issue of the journal *Virology*.

Kathryn Jones and Elizabeth Stroupe, both assistant professors in the Department of Biological Science, have deconstructed a type of virus called a [bacteriophage](#), which infects bacteria. Their work will help researchers in the future have a better understanding of how the virus invades and impacts bacteria, and could be particularly useful for the agriculture industry.

"It turns out there are a lot of novel things about it," Jones said.

Until now, there was little known about this particular bacteriophage, called the ϕ M12, which infects a nitrogen-fixing bacterium called *Sinorhizobium meliloti*.

Jones focused on the sequencing the DNA of ϕ M12 and analyzing its evolutionary context, while Stroupe looked at its overall physical structure.

"The bacteriophage is really just a tool for studying the bacterium," Stroupe said. "No one thought to sequence it before."

That tool, Stroupe said, will give scientists more insight into the basic functions of the ϕ M12 bacteriophage. ϕ M12 is the first reported

bacteriophage to have its particular combination of DNA sequences and the particular shape of its protein shell. Understanding both the DNA and structure can provide an understanding of the proteins a bacteriophage produces and how it chooses the bacteria it invades.

In the case of ϕ M12, this could be particularly useful in the future for the agriculture community and seed companies. Important crop plants depend on [biological nitrogen fixation](#) by the [bacteria](#) that is preyed upon by this phage. Nitrogen fixation is the process by which abundant nitrogen gas in the atmosphere is converted to the scarce soil resources ammonia and nitrate.

More information: Jones and Stroupe's work, divided into two articles, will be featured on the cover of *Virology*. [One](#), authored primarily by Jones and an undergraduate honors thesis student, Tess Brewer, focuses on the genetic makeup of the virus, while the [other](#) by Stroupe and colleagues, examines the physical structure.

Provided by Florida State University

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