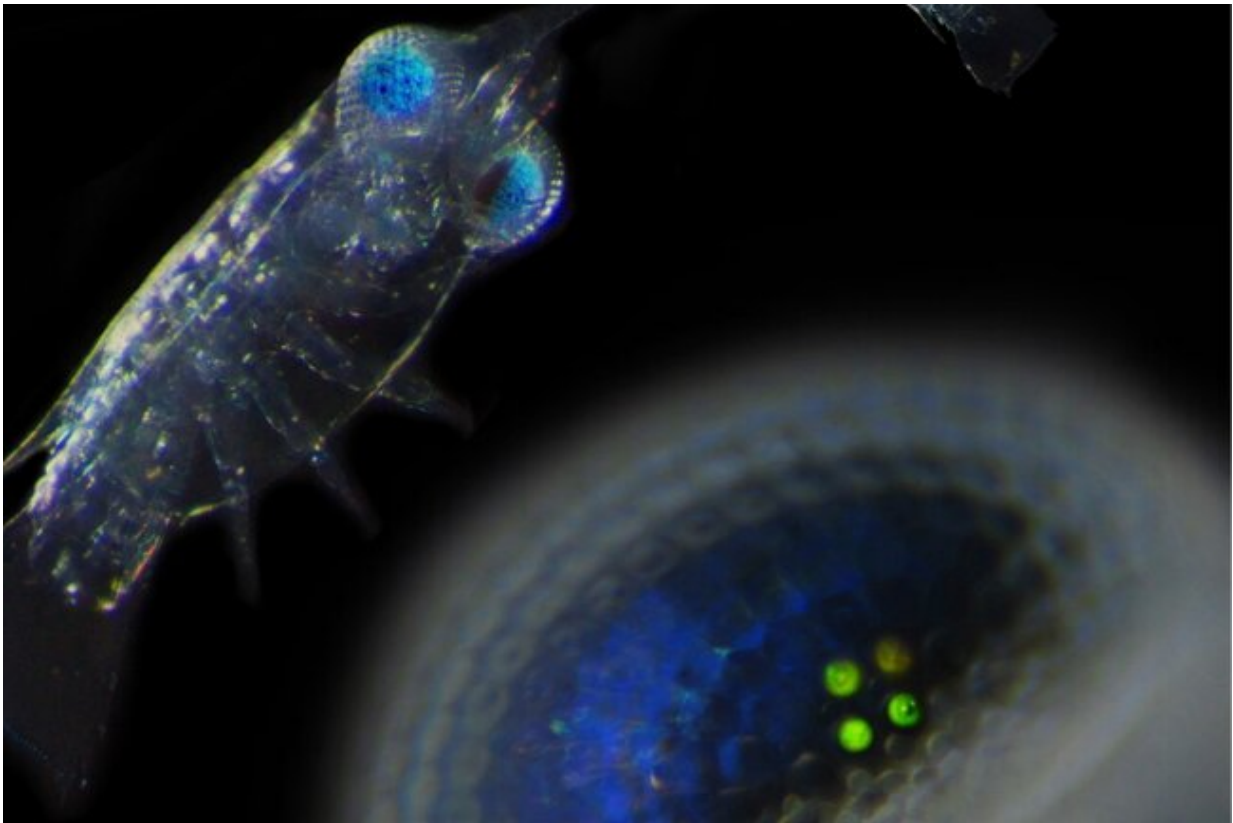


New type of visual filter discovered in an unlikely place

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Credit: University of Minnesota

A University of Minnesota-led research team recently discovered a new way animals can modify their vision. Crystal-like structures in the photoreceptors of larval mantis shrimp simultaneously reflect and

transmit light onto light sensitive cells. This newly described structure resembles how a human-made optical device, known as Fiber Bragg Grating, works. Fiber Bragg Grating is a filter commonly used in sensors that monitor extreme conditions for a variety of industries.

"Nature often inspires human design and invention," said Kathryn Feller, Ph.D., the study's lead author and a [researcher](#) in the College of Biological Sciences at the University of Minnesota. "In this case, humans invented something before they knew a natural analog existed. The [structure](#) discovered in mantis [shrimp](#) offers a different way to build a useful optical device."

In an article published today in the journal *Current Biology*, Feller and colleagues describe the unique filters. "While many animal eyes use either reflectors or colorful filters—such as cats and birds, respectively—to tune their vision, this is the first example of a visual structure that simultaneously reflects and filters a band of light in a living creature," said Feller.

Researchers found each reflecting filter is located within the rhabdom—or photoreceptive unit—of a larval compound eye and selectively reflects a band of yellow light from a crystalline assembly of small, spherical units within the structure. Feller states that out of the 17 or more mantis shrimp families, the larvae of only one family (Nannosquillidae) possess these reflectors. Scientists hypothesize that the structures may help the mantis shrimp larvae see bioluminescence.

"The big question is what this new larval visual system can tell us about the evolution of adult [mantis shrimp](#) color vision, which is the most complex on the planet," said Feller.

More information: Kathryn D. Feller et al, Long-Wavelength Reflecting Filters Found in the Larval Retinas of One Mantis Shrimp

Family (Nannosquillidae), *Current Biology* (2019). [DOI: 10.1016/j.cub.2019.07.070](https://doi.org/10.1016/j.cub.2019.07.070)

Provided by University of Minnesota

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