Research team uses beamtime at the CLS to examine the adhesive made by the Eastern oyster

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By examining the materials created by one creature, oyster adhesive, Dr. Rebecca Metzler and her team can contribute to the large task of rehabilitating marine habitats along the Atlantic, Eastern and Gulf of Mexico coasts.

The Eastern oyster, Crassostrea virginica, is a vital part of a healthy coastline. It creates an ecosystem and reef habitat for many other marine creatures by attaching to its neighbours with an adhesive that hardens under water and sticks the oyster to one location for life. But as climate change continues and other environmental pressures alter ocean temperatures and chemistry, these important ecosystems are becoming more fragile than ever before.

"Understanding the composition and structure of the oyster adhesive provides us with information critical for both design of biomimetic materials and supporting oyster reef re-establishment," says Metzler, an assistant professor at Colgate University in New York.

Using the CLS the team was able to examine the adhesive as closely as possible to learn how it is made and how it can remain in one location for such a long time. With the technology at the CLS, the team was able to explore both the chemical makeup and the level of hardness/softness of the adhesive. The results will inform scientists and ecologists to help ensure rehabilitation methods are as effective as they can be.

"If we had been able to only look at one element we would not have been able to make such conclusions and would have been very limited in what we could say about the adhesive," says Metzler.

Dr. Metzler says she is grateful for the expertise and assistance she got from the scientists on staff at the CLS.

"Not only is the CLS a great facility, but the beamline scientists, staff, and other users are amazing... The CLS provided me with the ability to conduct longer term experiments—more time than many other light sources—and was willing to work with me to make sure my experiments would work," says Metzler.

More information: Rebecca A. Metzler et al. Composition and Structure of Oyster Adhesive Reveals Heterogeneous Materials Properties in a Biological Composite, *Advanced Functional Materials* (2016). DOI: 10.1002/adfm.201602348

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