Dino Team Returns to SSRL

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Paleontologist Peter Larson with the 72-million-year-old forearm of a duck-billed dinosaur named "Leonardo." Traces of the scales that covered the skin are still visible.

The experimental hutches at the Stanford Synchrotron Radiation Laboratory are well familiar with a macabre tide of materials brought in for close investigation. A recent tally includes ancient parchment texts, human brain tissue, fly heads and fish embryos, to name only a few.

Last April, a team of researchers arrived with a menagerie of fossilized dinosaur parts for a pioneering first-go at using x-rays to reveal traces of soft tissue embedded in the stone fragments.

In December, just before the holiday break, the dino crew returned to SLAC with an expanded team for another round of investigations. What they're learning is revolutionizing the science of paleontology.

"This is a whole new area of our science that no one has ever done before," said Peter Larson, a paleontologist from the Black Hills Institute and one of the team leaders. "It's sort of like what Columbus and the earlier explorers learned to do… we're testing the waters to find out how we can improve our methods."

Larson and his team returned this time with a selection of samples that included the forearm of a 72-million-year-old duck-billed dinosaur named "Leonardo." Using x-ray fluorescence spectroscopy at SSRL beamline 10-2, the group glimpsed for the first time some of the soft tissues, or "chemical fossils," embedded in stone, that are otherwise invisible to our eyes. Mapping the traces of light elements such as phosphorous, sulfur and silicone has yielded clues to the structure and composition of soft tissues of these ancient creatures.

Larson says that perfecting these x-ray techniques on fossilized soft tissues will help paleontologists address questions about dinosaurs that have long been thought unanswerable, and is shedding light on the mechanism of fossilization itself.

"It's changing the way we think fossils are preserved," he says. "Before, we thought of these tissues as petrified, having changed to something else. This machine is helping us understand that process."

Source: Brad Plummer, SLAC Today