

Student identifies difference between the dinosaur sexes

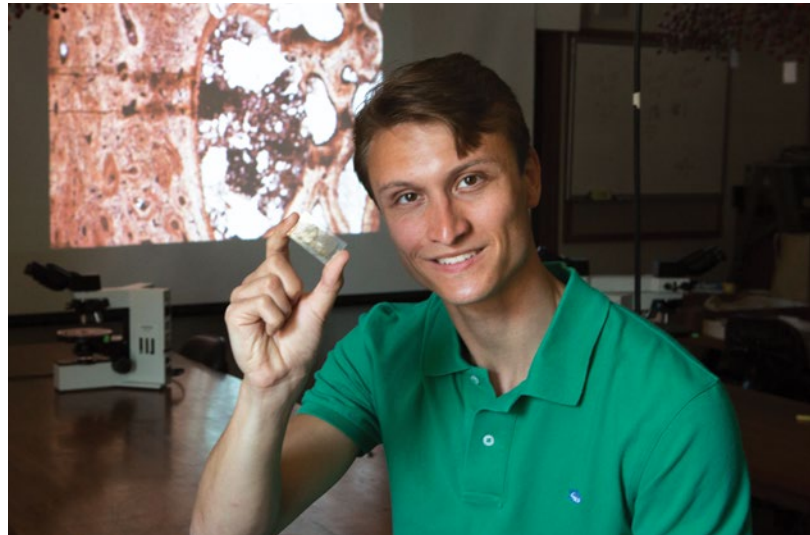
THE DISCOVERY OF A SINGLE ANATOMICAL DIFFERENCE between males and females of a species of *Stegosaurus* provides some of the most conclusive evidence that some dinosaurs looked different based on sex, according to research published in *PLoS One* and conducted by Evan Saitta while he was an undergraduate at Princeton.

The study found that the back plates of the species *Stegosaurus mjosi* came in two varieties that indicated the animal's sex — short and wide, and tall and narrow. Females had one type of plate and males the other. The lack of a particular female-specific bone tissue found in birds and some dinosaurs, however, made it difficult to determine which sex had which plate type.

Saitta, who graduated from Princeton in 2014 and conducted the research for his senior thesis project, drew from existing animals, particularly horned animals, to suggest that the distinct shape of male and female *S. mjosi* plates indicated two different functions. He supposes that the tall, narrow plates belonged to females, who would have needed the pointier plates to defend themselves against predators. The wide plates, which were 45 percent larger in surface area, likely served as “billboard” displays males used to attract females, similar to the plumes of the male peacock.

Beyond the implications for *Stegosaurus*, the research establishes that sexual dimorphism — in which males and females of a species have distinct physical forms — could exist in non-avian dinosaurs, a group that includes iconic reptiles such

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as *Tyrannosaurus* and *Brontosaurus*, Saitta said. Existing work on sexual dimorphism in non-avian dinosaurs had been inconclusive. Saitta is now a graduate student at the University of Bristol in the United Kingdom.

Andrew Farke, the Augustyn Family Curator of Paleontology at the Raymond M. Alf Museum of Paleontology in Claremont, California, said that the work provides a potential foothold for other researchers wanting to explore sexual dimorphism in *Stegosaurus* and possibly other non-avian dinosaurs.

“This is very species specific, so there’s a lot of work that needs to be done to extend this to other animals,” said Farke, who is familiar with the study but had no role in it. “It’s not the end of the road, but I think it will stimulate people to look at this issue in *Stegosaurus*.” —By Morgan Kelly

Nobel Prize in economics goes to Angus Deaton

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Angus Deaton, the Dwight D. Eisenhower Professor of International Affairs and a professor of economics and international affairs in Princeton's Woodrow Wilson School of Public and International Affairs, was awarded the 2015 Nobel Prize in economics for his contributions to understanding consumption at the individual level and in aggregate.

Imaging system tracks brain activity of a freely moving worm

TO EXPLORE HOW THE BRAIN controls behavior, researchers have for the first time captured the whole-brain activity of a freely moving animal, in this case a nematode worm called *Caenorhabditis elegans*.

Using an imaging system they designed, Andrew Leifer, a Lewis-Sigler Fellow, and Joshua Shaevitz, an associate professor of physics and the Lewis-Sigler Institute for Integrative Genomics, measured the activity of 78 of the worm brain's 125-plus neurons, which they engineered to turn green when active.

The setup consists of cameras that monitor the worm's position and a motorized stage that adjusts to track the worm as it roams freely. The researchers were able to show significant correlations between neuron activity patterns and behaviors such as moving backward or forward, and turning. The team included Jeffrey Nguyen, a postdoctoral research associate and first author on the study, and colleagues at the Lewis-Sigler Institute and the Princeton Neuroscience Institute.

The study was posted on the preprint server arXiv.org and was funded by Princeton's Dean for Research Innovation Fund for New Ideas in the Natural Sciences, the Simons Foundation and the National Institutes of Health. Watch the videos at discovery.princeton.edu. —By Catherine Zandonella