UNIVERSITY OF CHICAGO | SPRING 2007 | BIOLOGICAL SCIENCES DIVISION

Medicine ON THE MIDWAY

Focusing on Chiari

page 14

A Bug Scientist's Life

At Argonne National Laboratory just west of Chicago, where scientists study everything from the atomic nucleus to global climate change, Jake Socha shoots bugs.

Sometimes he takes X-ray videos of them to watch globs of dyed food alternately compress and stretch through their digestive systems. Other times he takes high-powered X-ray images of the branching patterns in their respiratory systems.

"They're the most successful survivors on earth," he said. "I'm just trying to find out why."

Socha, PhD '03, is a biomechanist at Argonne, where he works with physicist Wah-Keat Lee and organismal biologist Mark Westneat. His office is just a few yards away from Argonne's ultra-powerful Advance Photon Source, which has the most brilliant X-ray beams in this hemisphere.

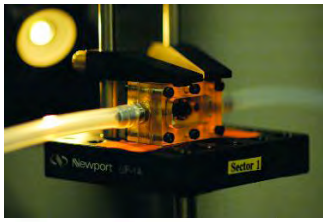
When Socha acquires "beam time"—a few days every few months when he can use those X-rays—he sets up his beetles, butterflies, dragonflies, grasshoppers, moths and bees and fires away for up to an hour at a time. In the past few years, he and his team have photographed and studied thousands of creatures.

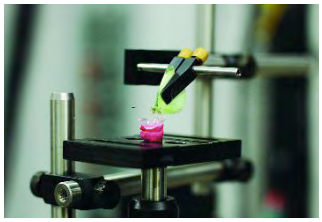
"I'm looking at their patterns of fluid movement," he said, "be it food or air."

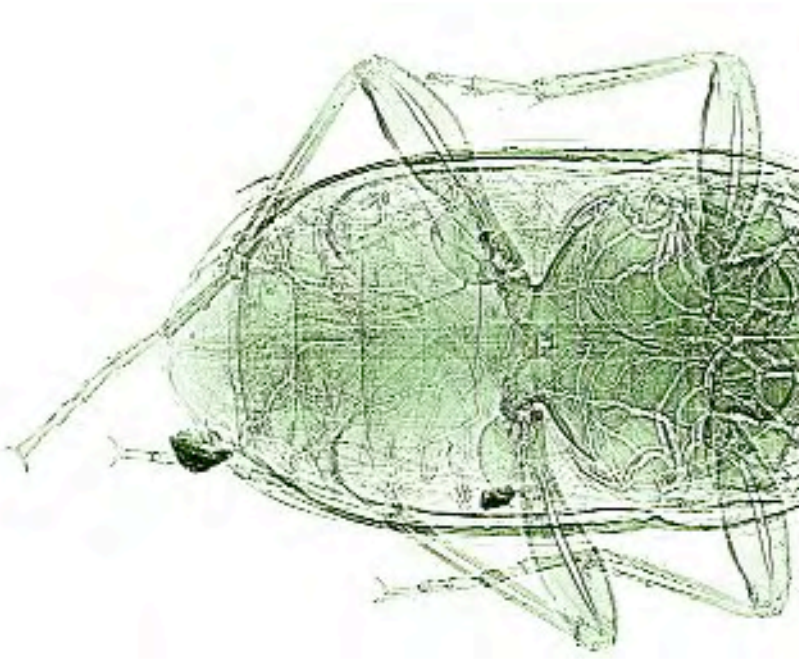
Many insects have thousands of tracheal tubes that spread like webs throughout their bodies. By contrast, Socha said, we humans have "two lungs that connect via a single tube to the outside world."

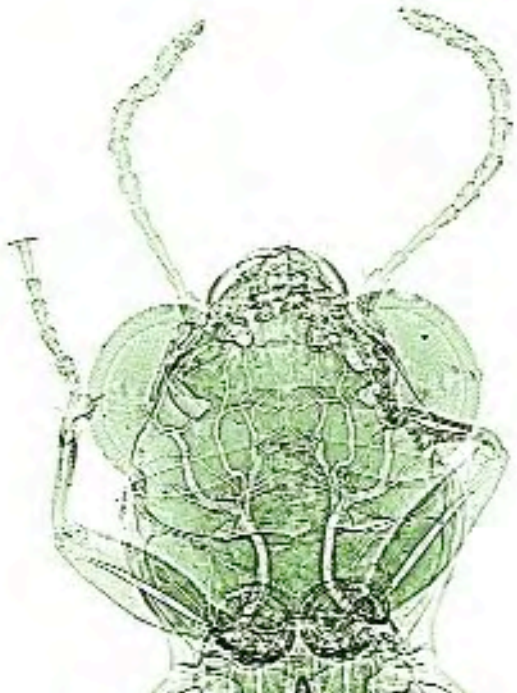
So what makes insects so much more likely to survive a possible apocalypse than humans? Socha has no concrete answers just yet, but any number of X-rays could hold the key.

—Katie Scarlett Brandt









On these pages: **At Argonne National Laboratory, the Advance Photon Source supplies some of the most powerful X-rays in the world to reveal the fine details of the respiratory systems in these small animals.** *Photos courtesy of Jake Socha*

On the cover: **David Frim, section chief of pediatric neurosurgery.** *Photo by Dan Dry, X-ray on back cover courtesy of David Frim*