

## Ants on a Raft

For many insects (e.g., ants), rain puddles, rainstorms or just a quick shower can be disastrous. However, in 2011, researchers from Georgia Tech discovered ants' tactical move to stay alive when faced with unwelcome water. The team, David Hu, Craig Tovey and Nathan Mlot, used time-lapse photography and mathematical modeling to discover how fire ants work together to form a water-repellant, buoyant raft. The researchers found that fire ants enhance their water repellency by linking their bodies together, similar to fabric weaving. When constructing these rafts, the ants grip each other with mandibles, claws and adhesive pads with a force 400 times their body weight. Research also notes that the raft provides cohesion, buoyancy and water repellency to its passengers, all the while being assembled in less than 100 seconds.



The researchers continued their work this year and used a miniature CT scanner to discover exactly how the ants connect with each other. Generally, the ants connect in a perpendicular fashion, rather than parallel, to allow for expansion and contraction abilities. On average, each ant connects to 4.8 neighbors, which can add up to 14 connections, and that the insects use their legs to extend the distance between each other.

"Increasing the distance keeps the raft porous and buoyant, allowing the structure to stay afloat and bounce back to the surface when strong river currents submerge it," says Mlot. They also learned that smaller ants will fill any gaps in between larger ant connections, which helps with water seepage and prevents weak spots in the raft.

Visit [www.news.gatech.edu/2014/06/12/going-inside-ant-raft](http://www.news.gatech.edu/2014/06/12/going-inside-ant-raft) to view a video of the raft in action.



## Firefly Light Technology

Syracuse University scientists Mathew Maye and Rebekah Alam discovered how to harness fireflies' natural light by using nanotechnology. Here's how: Fireflies produce light through a chemical reaction between luciferin and the enzyme luciferase. The scientists attached the enzyme to a nanorod. Luciferin, which is added later, is the fuel. The energy that is released when the fuel and the enzyme interact is transferred to a nanorod, causing it to glow. "Firefly light is one of nature's best examples of bioluminescence," Maye says. "The light is extremely bright and efficient. We've found a new way to harness biology for nonbiological applications by manipulating the interface between the biological and nonbiological components."

Maye says the rods are the same materials used in solar panels and LED lights. "It's conceivable that someday firefly-coated nanorods could be inserted into LED-type lights that you don't have to plug in."

"The mosquito is the state bird of New Jersey."

*Andy Warhol*

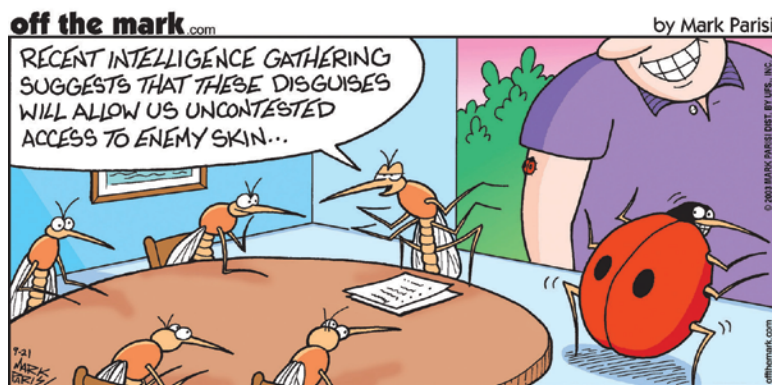


"I'm going to float like a butterfly and sting like a bee. . . ."

*Muhammad Ali*

## Insect Factoids

- Queen female **termites** have been known to live for 50 years.
- **Dragonflies** can fly up to 60 mph.
- Female **stick insects** can grow to more than 14 in. in length.
- Only female **mosquitos** bite humans and animals.
- **Honeybees** maintain a constant temperature of 93 °F within the hive year-round.



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**AUGUST** Safety Photo of the Month



*Fiddler on the Roof, revisited.*

Photo from Steven Pomponi, National Capital Chapter