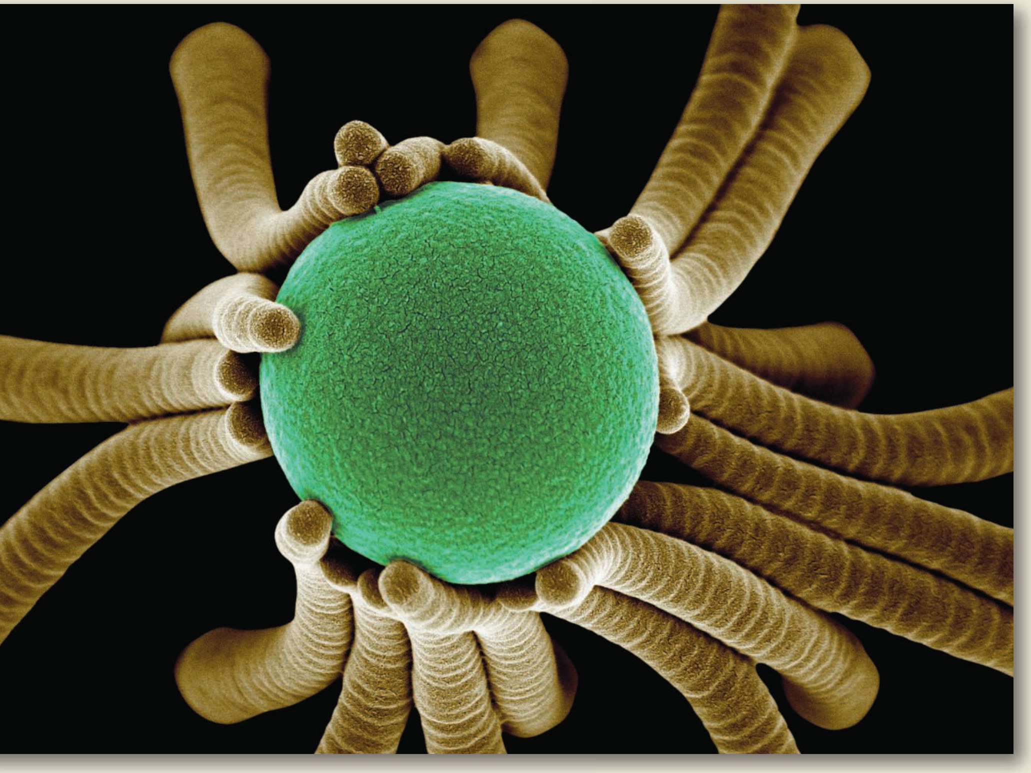
# Photography

First-Place Winner



## Save Our Earth, Let's Go Green

Sung Hoon Kang, Boaz Pokroy, and Joanna Aizenberg, Harvard University

Noodlelike fibers stretch to latch onto a green sphere. Alone each fiber is powerless, but together they grip and support the orb, embodying cooperation at a microscopic scale. This electron microscope photograph catches self-assembling polymers in action, but it could also represent people's cooperative efforts to save Earth, says materials scientist Joanna Aizenberg of Harvard University. "Each hair represents a person or an organization," she says. "It shows our collaborative effort to hold up the planet and keep it running."

Aizenberg and her colleagues design self-assembling polymers in hopes of creating energy-efficient materials. They have snapped many similar photos of micrometer-scale cooperation. This image shows hairlike fibers of epoxy resin assembling around a polystyrene sphere, which is about 2 micrometers in diameter. When the scientists added a drop of water containing these spheres, the hairs were standing straight up. But when the liquid began to evaporate, the fibers wound around the sphere. The hairs aren't attracted to the sphere chemically or magnetically; instead, capillary action glues them to it. (These same forces make wet hair clump.) "We're trying to make the process reversible and potentially use it in drug release or self-cleaning materials," Aizenberg says. She envisions polymer fingers that grab dust particles or floating bacteria and then later release them to flush the contaminants away.

The judges enjoyed how the photograph wove together a gorgeous image with an important message. "This image simply sprang forth from the page as the most arresting, aesthetic, and provocative image in this category," says panel of judges member Tierney Thys.

## Microbe vs. Mineral—A Life-or-Death Struggle in the Desert

Michael P. Zach, University of Wisconsin, Stevens Point

Although the bursts of rainbow colors in this photograph are mesmerizing, microbes fight for their lives in the background. Chemist Michael P. Zach of the University of Wisconsin, Stevens Point, snapped this image of a salt sample he collected in a hot, arid valley near Death Valley National Park in California. He crushed the salt, placed it under a microscope slide, and added a drop of water. Suddenly a slew of microbes came to life as the salt crystals dissolved. Then when the water started evaporating, he took the picture. (The colors come from light passing through the growing crystals, which act like prisms.) The microbes evolved to live in this salty, scorching landscape by excreting molecules that halt crystal growth, which helps them avoid getting trapped in the salt. Zach was drawn to the photograph because it captures "the intrigue of a life-and-death struggle in just one drop of water."





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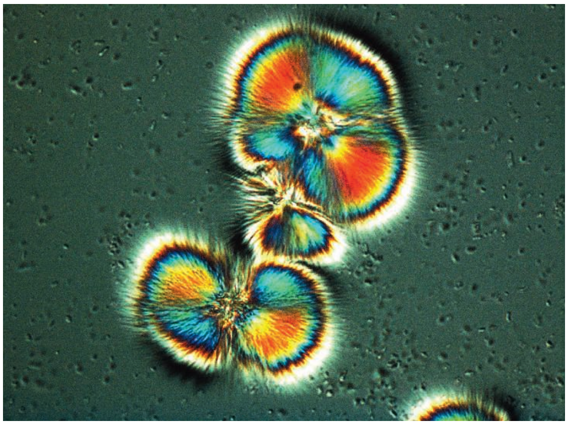
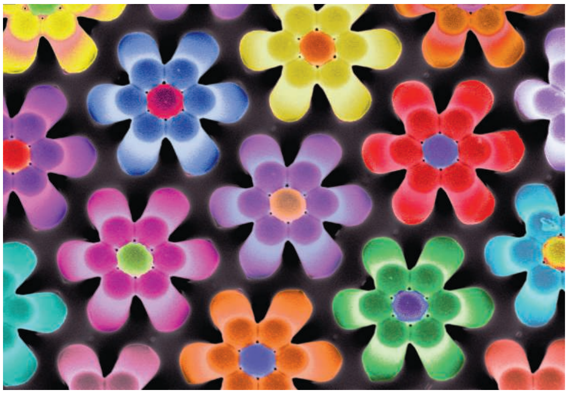
## Honorable Mentions





### Flower Power

Russell Taylor, Briana K. Whitaker, and Briana L. Carstens, University of North Carolina, Chapel Hill

Accidents can sometimes be beautiful. Briana Whitaker and Briana Carstens of the University of North Carolina, Chapel Hill, snapped this photograph as a quality-control step in their experiments to study the forces that cells, such as those that stitch together skin wounds, exert. They visualize these forces by watching how forests of 10-micrometer-tall polymer pillars bend when they place the cells on top of them. Ideally, the pillars should stand straight up, but on this occasion most of the pillars had fallen over. Amazingly, though, they'd all collapsed into a flower-petal-like pattern. "If you zoom out, you can see a whole field of view of these pillars collapsed in the same pattern," Carstens says. Usually the rods twist around each other and form an unappealing mess. So when the scientists saw this repeating pattern, they decided to color them in pastels and create this paisley photo.

### Self-Fertilization

Heiti Paves and Birger Ilau, Tallinn University of Technology

Within its tiny white flowers, thale cress (*Arabidopsis thaliana*) does what most plants avoid: It fertilizes itself. Heiti Paves of Tallinn University of Technology in Estonia took this photograph of the flower with its pollen grains and ovaries stained blue to show the process in action. From the six pollen heads, the grains grow thin tubes toward the bean-shaped ovaries in the flower's stigma to fertilize them. Because of the microscope technique used, polarized light turns the normally white flower yellow and the background blue. Scientists have used *A. thaliana* in many genetic studies because its self-fertilization makes experiments clearer. Gregor Mendel used a self-fertilizer, the pea, to build his genetic theories, Paves notes.





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