ILLUSTRATION

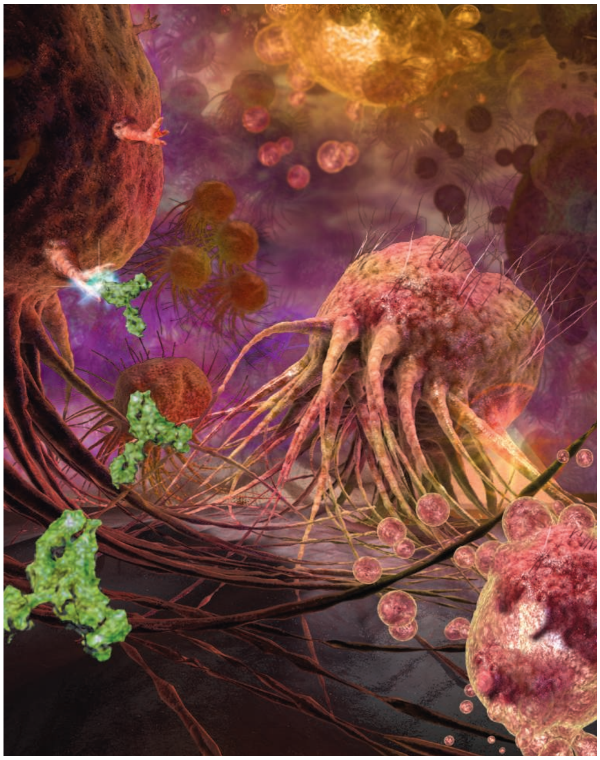
HONORABLE MENTION

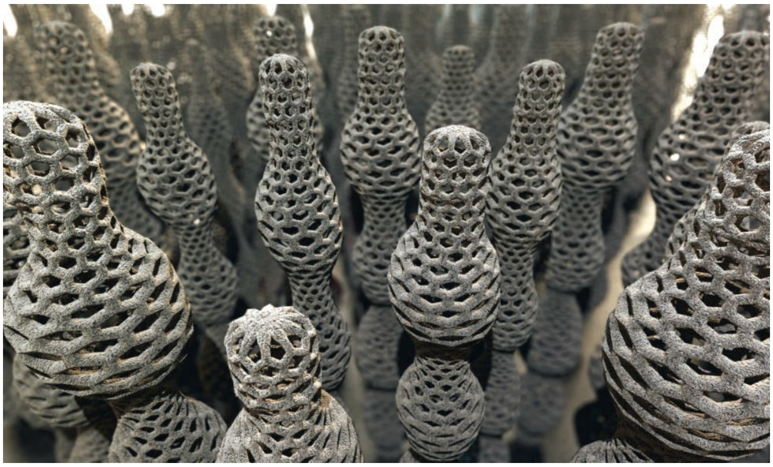
Tumor Death-Cell Receptors on Breast Cancer Cell

Emiko Paul and Quade Paul, Echo Medical Media;
Ron Gamble, UAB Insight

Cancer cells get the monster movie treatment. If Emiko Paul of Echo Medical Media's illustration of breast cancer cells looks like something out of an H. P. Lovecraft short story, it's no accident. "We wanted to show something that was dramatic and very active," Paul says.

This image, modeled using 3D software then painted in Adobe Photoshop, depicts the war on cancer in a manner that makes clear who the bad guys are. Paul drew on microscopic images of breast cancer cells—seen here looking like creatures with long tentacles—for inspiration. But her illustration also depicts a possible weapon against these malignant tissues: an antibody developed by researchers at the University of Alabama, Birmingham, called TRA-8 (the green, globular structures). This molecule activates a protein on the surface of many cancer cells, which then triggers a chain of events that kills off those cells, much like a self-destruct switch. TRA-8, whose efficacy researchers are currently exploring, could be the garlic to cancer's vampire.





HONORABLE MENTION

Variable-Diameter Carbon Nanotubes

Joel Brehm
University of Nebraska, Lincoln

Nanostructures, as the name implies, are much too small to see. But using 3D modeling techniques and some guesswork, graphic artist Joel Brehm renders a handful of these ultrathin structures visible to the naked eye. Brehm's illustration focuses on the work of his colleague, Yongfen Lu, an engineer at the University of Nebraska, Lincoln. Lu and colleagues employ lasers to develop new methods for crafting thin tubes made from carbon. But not just any tubes. His team's method precisely varies the diameter and properties of these structures. The resulting tubes, seen here, widen, narrow, or even bulge out like pears along their length. These designs could improve transistors and sensors in a range of electronics, the team says.

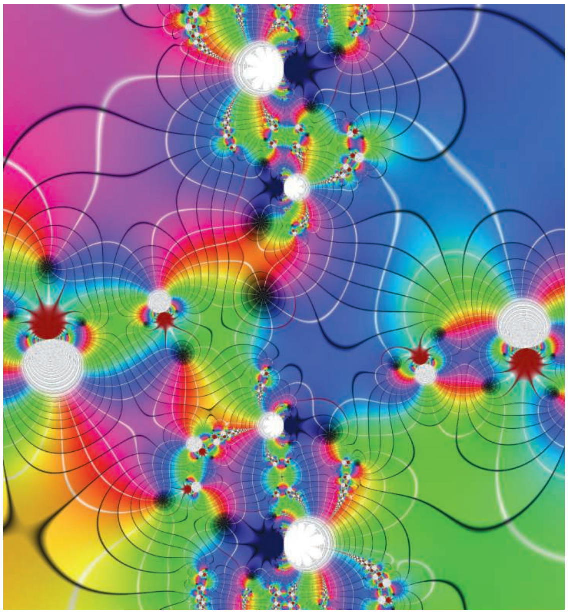
The tricky part, Brehm says, was making the nanotubes look small even though they'd been blown up to poster size. To do that, he added a granular texture to the honeycombed stalks and also brightened their edges. Those small touches, he says, made the tubes look more like objects viewed through an electron microscope.

NOTE: **There was no 1st place prize awarded in Illustration.**

HONORABLE MENTION

Exploring Complex Functions Using Domain Coloring

Konstantin Poelke, Konrad Polthier
Free University of Berlin



Mathematicians discover their hippie sides. Forgoing long strings of digits and variables, researchers at the Free University of Berlin have taken a tie-dye approach to visualizing math equations. This illustration represents one example of a complex function. Such functions are mathematical relationships that incorporate both real numbers and what experts call imaginary numbers, such as the square root of –1.

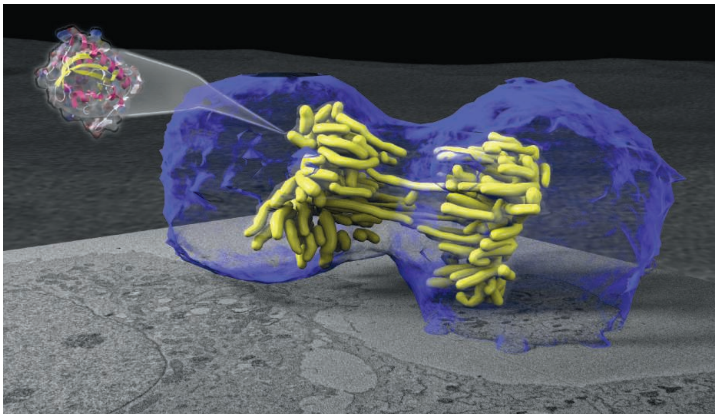
Unlike familiar sine waves or logarithmic curves, complex functions are four-dimensional, combining both inputs and outputs in two dimensions. To visualize these heady equations, Konstantin Poelke and his Ph.D. supervisor Konrad Polthier turned to and improved a technique called domain coloring. They assigned each complex number in their equation to a spot on a color wheel. The further numbers get from zero, the brighter they are (white regions, for instance, represent mathematical "singularities" that approach infinity). The result is like a topographic map, but it packs two dimensions of information (hue and brightness) into each point instead of the single dimension of altitude.

Such functions may fly right over the heads of many nonmath enthusiasts, Poelke says. But he hopes casual viewers will understand the basics of the relationships between the complex numbers shown here just by looking at the arrangement of the psychedelic shades.

PEOPLE'S CHOICE

Separation of a Cell

Andrew Noske and Thomas Deerinck
The National Center for Microscopy and Imaging Research; Horng Ou and Clodagh O'Shea, Salk Institute



From films like *Avatar* to hand-held video games, 3D is all the rage. Textbook graphics are not catching on. In this illustration, Andrew Noske of the National Center for Microscopy and Imaging Research at the University of California, San Diego, and colleagues create a visualization of mitosis that hops off the page.

The new and tactile view of a cell undergoing division comes thanks to a specialized protein called MiniSOG. This molecule, which Noske's team shows zipping toward the reader, is fluorescent and stands out crisply under an electron microscope. With some tweaking, it also binds tightly to a second protein closely associated with DNA. That gives scientists the ability to target and view in detail chromosomes as they peel apart during mitosis. The result is a far cry from the standard, flat images popular in biology textbooks, the team writes. And unlike the 3D glasses that accompany screenings of sci-fi films, this new visualization approach may be more than a gimmick, giving students a deeper look at a familiar phenomenon.

Science

Illustration

Science **335** (6068), 528-529.
DOI: 10.1126/science.335.6068.528