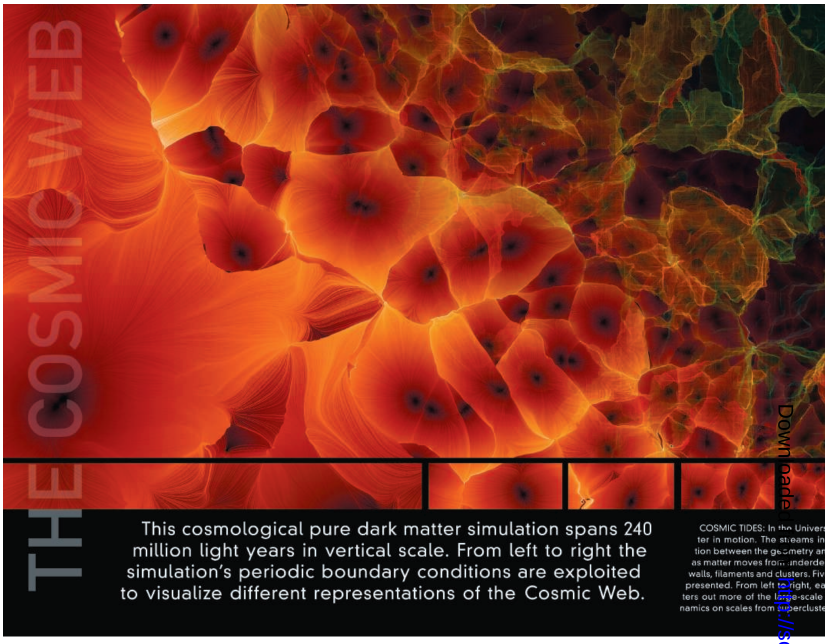
INFORMATIONAL POSTERS & GRAPHICS

1ST PLACE
The Cosmic Web

Miguel Angel Aragon-Calvo, Julieta Aguilera, Mark Subbarao
Johns Hopkins University



A spider's web catches flies. But the cosmic web depicted in the winning poster snares galaxies. Cosmologist Miguel Angel Aragon-Calvo of Johns Hopkins University in Baltimore, Maryland, and colleagues illustrate how an invisible network of matter creates space's familiar features: "This poster is [intended] to show the relationship between galaxies and the environment where they live," he says.

Galaxies don't grow out of nothing, Aragon-Calvo notes. Instead, their formation is decided by underlying but invisible accumulations of dark matter. Scientists suspect that this substance, which is still theoretical and remains impossible to observe, gives rise to most of the gravity in the universe. That gravity becomes the glue that holds galaxies together. So, in regions where dark matter is dense, galaxies begin to form, often grouping together in clusters or long walls.

In their poster, which from top to bottom represents about 240 million light-years, Aragon-Calvo and colleagues simulate that process. They explore the same patch of space from five different vantage points, traveling from the invisible to the visible. As the universe expands following the big bang, strings of dark matter condense along the edges of voids nearly tens of millions of light-years wide. These mostly empty regions of space can be seen at the far left of the poster (dark orange) bordered by bright filaments rich in matter. In the middle, weeping willow–like arcs follow the flow of matter over time. The lines converge at the present day, shown in red, and eventually spawn bright galaxies at the same points (far right). Depicting the entire "history of matter" in one poster is an ambitious task, but Aragon-Calvo hopes that viewers will come away with one message: "The universe has a rich structure." Just like a spider web.

This brightly colored illustration with accompanying text is "aesthetically beautiful," says challenge judge Corinne Sandone. And "I think it's fabulous that we can see some of the structure and to see it visualized as you move further and further into space."

HONORABLE MENTION
The Ebola Virus

Ivan Konstantinov, Yury Stefanov, Alexander Kovalevsky, Anastasya Bakulina
Visual Science

Not all good science visualizations highlight the beauty of the natural world. Take this illustration by Ivan Konstantinov and colleagues at the Russia-based group Visual Science. His team drew on existing scientific information to depict the 3D structure of the Ebola virus, responsible for fatal outbreaks of hemorrhagic fever throughout much of Africa.

This virus, only 1400 nanometers in length, is no simple pathogen, Konstantinov says. His group previously patched together a similar 3D model of HIV. But Ebola is nearly 10 times larger, containing roughly 3 million lipids and protein molecules. The poster, too, provides a good look at how Ebola turns dangerous. Proteins coded by the virus's own genome are shown here in maroon. They're the pathogen's Velcro, clinging to the surface of target cells and giving the virus access to their interior. Anyone perusing this poster "can clearly understand that the Ebola virion is a very complex supramolecular structure, with various polypeptides, lipids, and RNA genome included," Konstantinov says. Not exactly the stuff of an Ansel Adams photograph, but an eye-catching sight nevertheless.

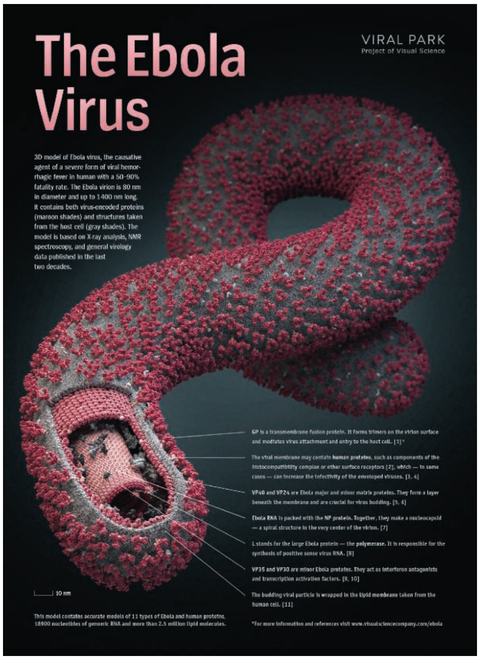
PEOPLE'S CHOICE

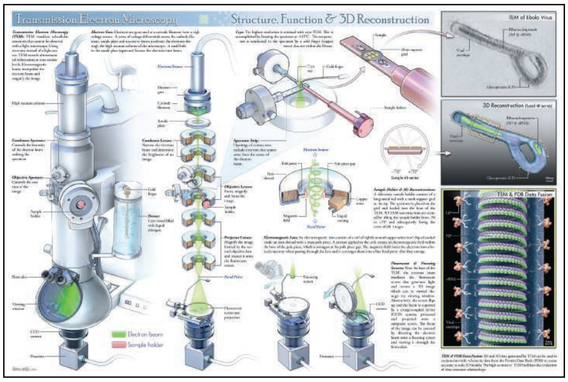
Transmission Electron Microscopy: Structure, Function & 3D Reconstruction

Fabian de Kok-Mercado, Victoria Wahl-Jensen, and Laura Bollinger
NIAID IRF

For anyone who's ever wanted to take apart a microscope to see how it works, this is the poster for you. Here, scientists at the National Institute of Allergy and Infectious Diseases Integrated Research Facility (IRF) in Frederick, Maryland, dismantle a transmission electron microscope (TEM) piece by piece—all without damaging expensive lab equipment. These instruments bombard tiny objects such as viruses or proteins with beams of electrons, capturing images too small for conventional light microscopes.

In their dissection, Fabian de Kok-Mercado and colleagues at IRF delve into deeper and deeper detail, moving from left to right. The researchers first display a TEM in its entirety. Then they follow the visualization tool down to its cryo-device (at right), which keeps organic samples cool for maximum clarity. In between, viewers themselves can track the formation of an electron beam from start to finish. It begins at the electron gun that creates the free particles using an electric current, then continues through a handful of lenses that condense, focus, and magnify the output. It's the ideal schematic for technology junkies who like to think small.





Science

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