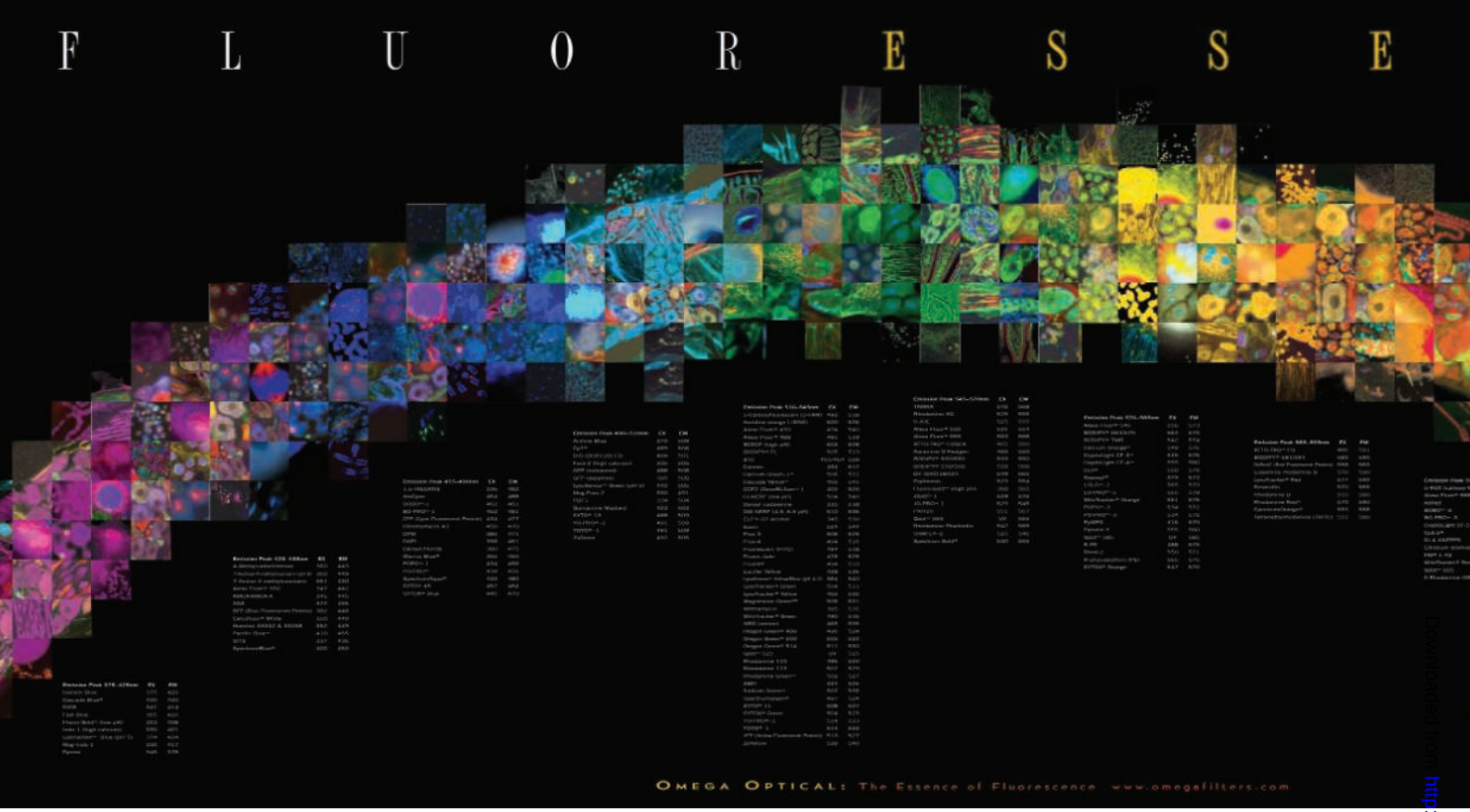

The Synapse Revealed

Graham Johnson, Graham Johnson Medical Media

Deep inside the brain, a neuron prepares to transmit a signal to its target. To capture that expectant, fleeting moment with painstaking detail, science illustrator Graham Johnson based his elegant, highly accurate drawing on ultrathin micrographs of sequential brain slices.

The brain contains billions of neurons, whose network of chemical messages form the basis for all thought, movement, and behavior. Johnson's illustration tells the story of one such signal, a synaptic millisecond that is both eye-catching and accurate in scale and shape. Using the brain slices as references, Johnson sketched the layout of the illustration in pencil, from the convoluted labyrinth of neurons in the background to the clusters of organelles inside the neural cells. After scanning the drawing into three-dimensional modeling software, he colored the image with a palette of dreamy, underwater colors and added the bumpy, realistic texture and glowing lighting reminiscent of a scanning electron micrograph—qualities that help outline the image, pull the central neural interaction forward, and give it a stronger impact, he says.

ILLUSTRATION
First Place

The resulting image is a careful balance between precision and beauty. Because the original data were so complex, Johnson cut the number of neuron interactions depicted to only 30% of the original data—"otherwise, it's just a mass of spaghetti in front of you," he says.

"It gives us the information we need, but at the same time brings an aesthetic, a refinement," says panel of judges member Felice Frankel. "That's really important: to get the viewer to want to look—and then to ask questions."

2005 VisualizationChallenge

Fluoressence: The Essence of Fluorescence

Cheryl Aaron, Omega Optical Inc.

A mosaic of colors and flares of light: all this, and emission peaks, too? The winning rainbow of light-sensitive molecules can both spice up a drab laboratory wall and provide a quick-reference guide for fluorescence microscopists.

Fluorescent molecules respond to irradiation by light of a known wavelength, such as ultraviolet, with a colorful glow of their own. As an incoming photon excites the molecule, its electrons vibrate and then relax to their lowest energy level, emitting a longer wavelength of light as the molecule returns to its ground state. Because the excitation and resultant emission wavelengths are highly sensitive and specific to a given fluorophore, scientists can use fluorescent dyes to generate telltale lights that label cells and different biological structures with great accuracy.

INFOGRAPHIC First Place

The poster was the brainchild of a team of marketing experts at Omega Optical Inc. The company makes optical filters for microscopes, and it wanted to give its customers a useful reference chart, says Omega marketing manager Cheryl Aaron. The design team used a rainbow of photographs of dyes and other fluorophores supplied by both employees and customers, and included critical emission and excitation wavelengths for each fluorophore, to create a graphic they hope will brighten many a university classroom or lab.

"It was a wonderfully intelligent approach to putting all of this information in one place" and also "quite beautiful," says panel of judges member Felice Frankel.

Autumn Color, Estonian Bog

James S. Aber, Emporia State University

With its intricate patterns within patterns and striking colors, the winning photograph bears a distinct resemblance to a fractal. But scale back—to about 150 meters above the ground—and the sinuous landforms of Estonia's Männikjärve bog begin to reveal themselves.

PHOTOGRAPHY First Place

In the peat bogs of east-central and southwestern Estonia, autumn works a change in the color scheme: Cotton grass turns gold, hardwoods in surrounding forests turn orange and red, and pine trees remain silvery green. The bog water, in sharp contrast, stays an acidic brown. Geologist James Aber of Emporia State University in Kansas recognized the potential beauty of the landscape when he was collaborating with Estonian colleagues to study the glacial geomorphology and geotectonics of the region. But to capture it, he knew he'd need to get off the ground—or at least, his camera would.

Aber used a conventional digital camera in an unconventional setting: He attached it to a kite and operated it from the ground like a radio-controlled model airplane, an early type of remote sensing that has been around since the 19th century. Aber has used the technique for 8 years and has even taught it in courses at Emporia State on aerial photography.

Kite photography "gives us a scale and resolution that are difficult to achieve in other ways," Aber says. The kite flies between 50 and 150 meters above the ground, too low for a conventional airplane and too high for a boom or tower structure.

The photograph was striking, not only because it creates a mood that matches the time of year and the subject of the image but also for its unique technique, says panel of judges member Gary Lees.

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Infographic

Carolyn Gramling

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