SQUARE

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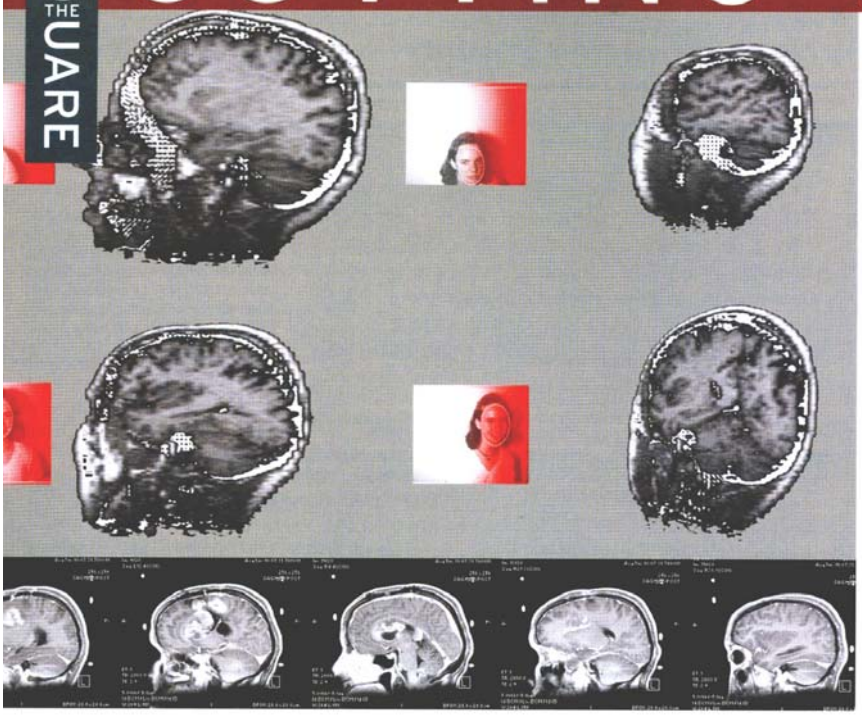

A NEW 3-D NAVIGATION SYSTEM ALLOWS SURGEONS TO EXPLORE THE BRAIN FROM EVERY ANGLE (TOP FOUR IMAGES); OLDER X-RAYS OFFERED ONLY 2-D VIEWS (BELOW).

neurosurgery

# JOURNEY TO THE CENTER OF THE BRAIN

by Janelle Nanos / GSAS '05

When sailing along northern Maine's craggy coast, Patrick J. Kelly, chairman of the neurosurgery department at the NYU Medical Center, has found that strong tidal currents and pea soup fog can prove as difficult—and dangerous—to navigate as the gray matter of the brain. "When you go out on a boat, you have a chart that shows you where water ends and land begins," he says. "Doing brain surgery is very similar. You might wander into an area that may leave the patient paralyzed or unable to talk for the rest of his life."

Fortunately, Kelly has found a cartographer in Jean-Marc Gauthier (TSOA '99), an assistant arts professor of interactive 3-D technology in the Tisch School of the Arts' interactive telecommunications program. For the past year, the two have worked together to create Web-based software that allows a viewer to upload a 3-D map of the brain that is made of MRI slices. This technology would provide surgeons with a better way to chart courses to remove deeply embedded tumors while avoiding damage to the brain's more vulnerable areas and blood vessels.

Employing data from magnetic resonance imaging (MRI), computed tomography (CT scanning), and angiography (blood vessel placement), Gauthier created the 3-D brain visuals with the same navigation technology he had used to build a 3-D interactive map of Manhattan. "They were two projects that complemented each other," Gauthier explains. "Whether using streets and avenues or the pathways in the brain, you have to find the best path to travel in a safe way." And the technology was overdue. "You'll see children play video games and you'll notice the sophistication of the graphic images," Kelly says. "Whereas the imaging we have in the medical field is not so photorealistic."

Gauthier and his students developed the brain-mapping program by first imagining the brain suspended in space and then building a prototype that allowed them to see it from every angle. He's now equipped the device with a hands-free Web cam that tracks the head movements of the surgeon, enabling the image to spin and shift on-screen. Both he and Kelly say that the technology could help surgical interns just as flight simulators train pilots and could potentially decrease the time and invasiveness of surgery by allowing doctors to better prepare before a procedure.

And there's one other possible application, Kelly says: "A video game called Brain Surgeon."