

Holography school teaches a new art

By Phyllis Magida

Twelve students are preparing to make a hologram.

They hover anxiously near five enclosed boxes that are about 5 feet long, 3 feet wide and 4 feet high.

The two or three at each box position mirrors and magnifying glasses between film, a laser and their subjects, such as Buddha statues, rubber ducks and fishing reels. A rectangular black box sits in one corner of each box, emitting an ultra-thin, red light beam.

After positioning everything, the students leave the room and turn off all lights except a green "safe" light. Five buttons are pushed, activating a shutter on each table. Each shutter opens for a few seconds, exposing a photographic plate long enough for the image to be recorded on film. Then the shutter closes.

The students return, remove their film and develop it. When they finish, about 30 minutes later, each group has processed a hologram.

The students are in an introductory holography class at Chicago's Holographic Center, 1134 W. Washington Blvd. The center's School of Holography offers 12 courses in this discipline, including Optics I—Exploring Light and Lenses for intermediate students, and Pseudocolor Holography, which deals with multiple-color holograms for advanced students. About 40 students enroll each year.

A hologram is a two-dimensional photograph that looks three-dimensional. The eagle with silver background on a VISA card is a hologram. So is the MC on a MasterCard.

"A hologram looks three-dimensional for two reasons: because of the properties of the laser beam and the way the optics are set up to record the object on film," said Loren Billings, who founded the Holographic



Joe Stephans prepares a hologram at Chicago's Holographic Center, supervised by teacher Jan Pels. When it's done, he will have a two-dimensional photo that looks three-dimensional.

Center and is one of eight directors. "A hologram actually records, on a light-sensitive film, the laser light waves that bounce three dimensionally off of an object."

A laser light is produced when one of several gases is put in a tube and then agitated by electrons that are sent into it, said Jan Pels, a teacher at the school. "The gas absorbs a little of this agitation—or energy—and releases the rest of it in the form of a beam, which we call laser light."

To take a simple hologram of something like a teddy bear, for example, a laser light beam is positioned so it shines on the bear like a flashlight. "Unfortunately, a laser [light] beam is even thinner than a flashlight beam," Pels said. "So we use mirrors and lenses to divert and spread some—not all—of the beam and shine it

onto the film. When both bear and film are lit by a laser beam and a picture is taken, the image that shows up on the film seems to be three-dimensional."

The students in the more advanced Holography II class make at least 10 holograms using different light intensities and developing procedures. (Courses increasing in difficulty go up to Holography V.) "They manipulate the variables of light to learn what changes cause the hologram to be brighter, dimmer or sharper," Pels said.

The school graduates about 40 holographers each year with a certificate of achievement, which they are awarded after mastering three courses, each 10 weeks long, in holographic basics.

"Our students are extremely serious," said Billings, who oversees all facets of the institution. "No

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matter what their ages—and students range from 18 to 65—most continue taking courses even after receiving certificates."

The student body includes college students majoring in disciplines such as photography, art, physics, engineering or medicine who receive college credits for these courses and professionals in these fields, Billings said. In the last five years, an increasing number of high school art and science teachers have taken the courses to complement their teaching. "So far we've trained over 800 students to be holographers," she said.

There are dozens of highly complicated holograms hanging in the center's first-floor museum. They include a tiny horse that seems to gallop toward a viewer and a blond woman who turns her back as a viewer passes. A pair of binoculars trained on a parrot and snake in a tree seem to protrude into space; when a viewer looks into the "lenses," he sees a magnified image.

Billings conducts about 400 museum tours each year for groups that include 2nd-grade classes, senior citizen clubs and scientists. Bil-

lings introduces them to the holograms and explains in simple terms how a hologram is made, who invented it and what some of the art and science applications are.

"I also teach them about the physics of light using holography as an explanatory tool," she said. "The future of holography is probably part of every industry, as well as being an art form of its own."

The current show, which will run through May 20, is titled "Equus/Under Water" and features 75 holograms by West Coast holographers Nancy Gorgione and Greg Cherry. The exhibition is a story of technology told through holography. Equus, the Latin word for horse, is used as a symbol of the advance of technology.

Fifteen years ago, few Chicagoans had heard of holography. When Billings and her husband, Robert, bought the Free Methodist Publishing House building in 1974, she used it as an art gallery for a year.

"As time passed, I got increasingly interested in holography, which I'd been studying seriously for two years at that time," she

said. "Finally, in 1976, we urged two friends to form a board of directors with us and we incorporated to become the Holographic Center."

The center held its first holographic exhibit a year later in the former art gallery, and the response was overwhelming, Billings said. "Over 5,000 people came to see the exhibit within one month. Our previous art shows had averaged only about 200."

That year, the Billingses also received a charter granting the center nonprofit status, and they opened the Museum of Holography.

Also that year, they assembled an advisory board of Chicago-area scientists and holographers, hired three teachers and opened the School of Holography. They started with three night courses and had 15 students. Today, they employ five teachers.

The Billingses then turned their attention to equipping several experimental laboratories in the building's basement and hired three professional holographers to do research for industry and improve holographic techniques. This research arm of the center is called the Fine Arts Research Holographic Facility.

"Holography is an amazing integration of hard science and hard art," said student Craig Anderson, 20, who has been at the school about three months. "The artistic end involves working out composition and perspective. But the scientific end involves technological understanding: The holographer must know what lasers to use, what angles to shoot from and how to set up the hologram so it will expose on film."

Anderson plans on taking additional courses at the center. He works at Northwestern University's Chicago campus in a research program in preventative immunology. His holography studies are for art's sake, he said.

The holography school offers more courses than are usually available at other institutions, Billings said.

"A few courses in holography are offered at the Royal College of Arts in London," she said. "In this country, many universities include some holography. But they usually present holography in conjunction with one of the disciplines such as physics."

There are numerous industrial applications for holography, Billings said. They include holographing airplane wings; holograms measure and show minuscule impacts and fault lines on some materials.

Despite its widespread use in industry, holography as an art is in its infancy, Billings said. "Dr. Dennis Gabor, a Hungarian physicist, discovered it in 1948. But interest was necessarily limited until lasers became readily available in the early '60s. [Gabor used a mercury lamp to make his early holograms.] Then, when Gabor won the Nobel Prize in 1971 for having invented holography, interest in this field really blossomed."

Because holography is so new, people haven't yet decided whether it is an art or a science, Billings said. "Here, we consider it an art. But I've applied to the Illinois Arts Council three times for aid and they continue to withhold funds, insisting that holography is a science."

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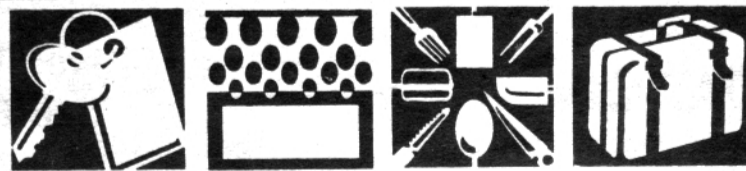
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