



## Goodfellows display spirit

Dan Cohen (left) and Doug Creighton brave traffic and falling snow to raise money for the Farmington Goodfellows during the group's annual paper sale last week. The Goodfellows sold more than 10,000 copies of this year's edition in their goal to see that every child would have a merry Christmas. Funds contributed to the drive go toward the purchase of gifts, food and clothes which are then distributed to families in the Farmington area who are in need. (Staff photo by Harry Mauthe)

# Laser art transcends science fiction

By ED BAS

The young woman winking and blowing you a kiss wants to change your world.

Enticing and entrancing, she is also bodiless, a wisp of a hologram that disappears when you are too close. Like a wood nymph, she vanishes, only to return and flirt again when you step away.

A hologram is a picture in three dimensions, created by laser. Displayed as art last month at Detroit's Renaissance Center, the example of woman-wink-kiss is just one portion of a practical science that is being used to design everything today from sewer pipes to your next automobile.

Joseph Der Hovanesian, engineering professor at Oakland University, spins scientific

webs of photomechanics, structural analysis and material optimization in discussing optics research at OU. But he is not surprised holography and its related sciences are also being exploited lately for their artistry.

Hovanesian regularly works with lasers and holograms, long held as features of science fiction stories, but a "new-old" science as far as he is concerned.

"Holography was invented in 1947," Hovanesian said. "It's discoverer, Dennis Gabor, was awarded the Nobel Prize in 1971. But pioneer work in photoelasticity was done by Sir David Brewster in 1812."

TODAY, LASERS can be compact and there are even portable, battery-operated models. Holograms, Hovanesian

said, followed after the first practical lasers were built in the 1960s. Today, he said, lasers are common in universities and industry.

Three OU professors conduct optics research—Hovanesian, A.J. Durelli and Y.Y. Hung. The work deals mainly with optimization—getting the most from a material, shape or object.

"Today, the big emphasis is on saving weight," Hovanesian said. "In automobiles, we want to take away as much excess weight as we can without sacrificing strength."

When pressure is applied to an object, lines of stress can be shown with the use of lasers—this is photoelasticity. A simple thing like a

circular tube, he said, can be studied for its optimum shape. It turns out that a circular tube is not efficient. Whether a sewer pipe or a subway tunnel, photoelasticity shows the shape would be much stronger if material is pared away to create a flattened oblong shape.

"You not only save weight by taking away material," Hovanesian said. "You actually make the object stronger."

"OU is fortunate to have one of the top men in the field of this research," Hovanesian said.

A.J. DURELLI is co-author of "Introduction

to Photomechanics" along with scholarly works such as "Optimization of Geometric Discontinuities in Stress Fields" published in "Experimental Mechanics" this year, written with two OU students.

But Hovanesian is worried that work in optics is falling behind in this country. Hovanesian blames it on "de-emphasis on graduate education and the layoffs in the aerospace industry."

"Today Ford is buying a system from Germany that was invented in the U.S.," he said. "There are all sorts of applications for this type of research. Lasers are used in surveying and for

gun sights. Photoelasticity helped Volkswagen cure problems with brake squeal. Chrysler is tinkering with an instrument panel display for automobiles. The Navy is looking into acoustical holograms to search for underwater objects."

Studies done of stress patterns in European Gothic cathedrals show they were engineered "near perfect" to how photoelasticity would have us build them today.

"Of course, we're only looking at the ones that are still standing," Hovanesian said. "Others that weren't so well designed never made it."

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