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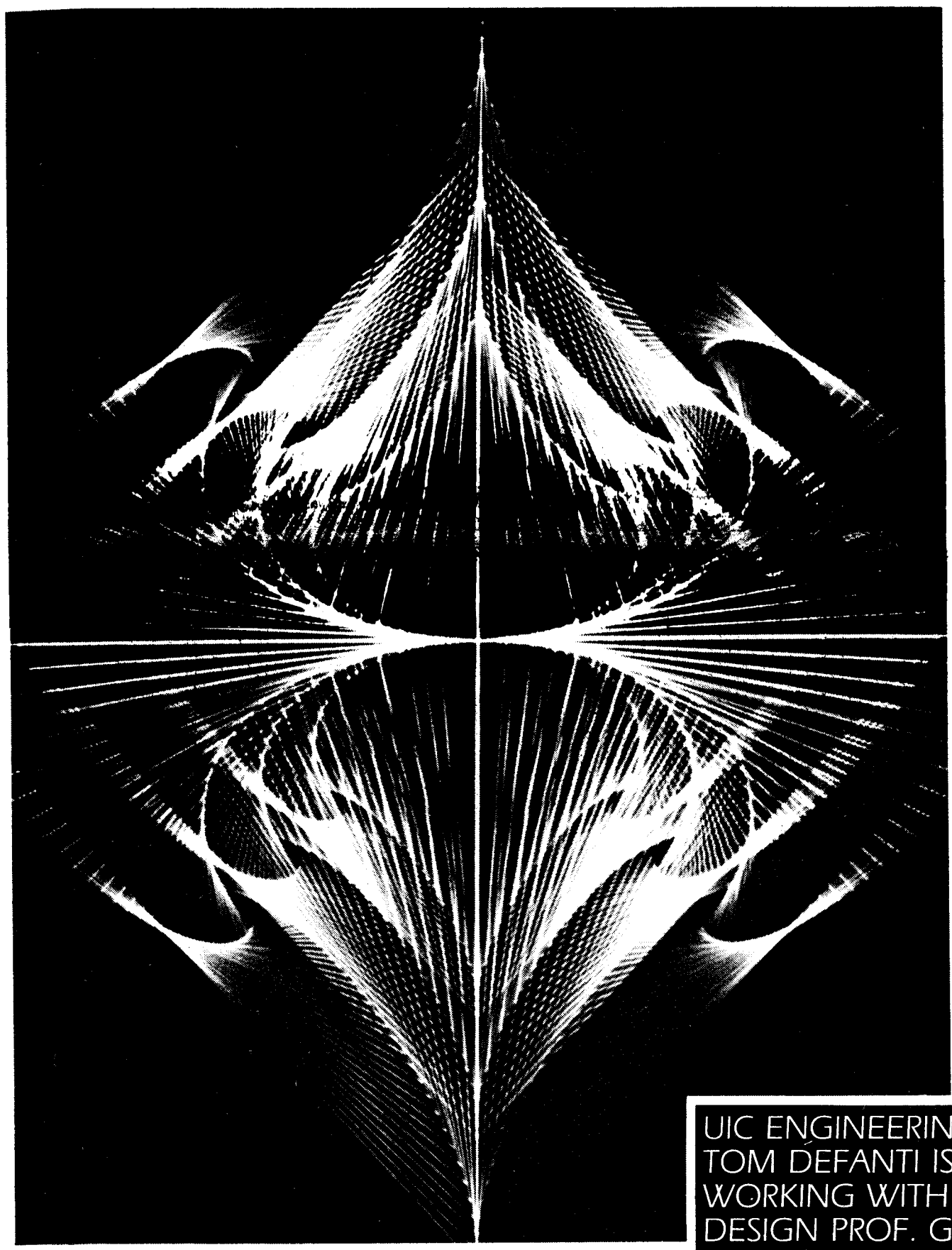

UIC ENGINEERING PROF. TOM DEFANTI IS WORKING WITH ART & DESIGN PROF. GUNTHER TETZ AND OTHER ARTISTS TO CREATE DAZZLING VISUAL EFFECTS.

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TOM DEFANTI (AKA DR. PAC MAN) IS UIC'S COMPUTER WHIZ KID PROF.

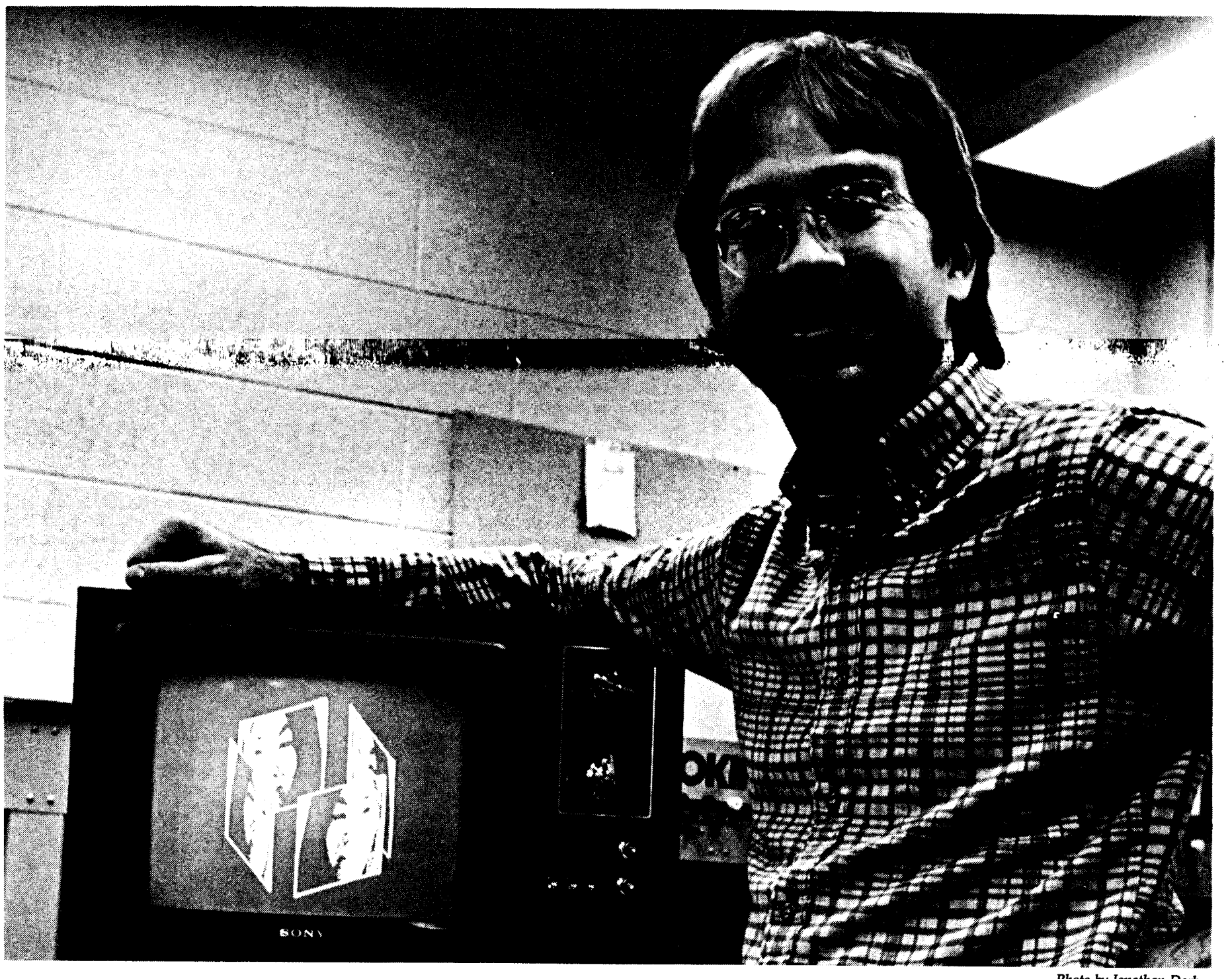


Photo by Jonathan Darby

By Susan Figliulo

If you are one of the millions whose Christmas list this year starts with a video game, pause for a moment to thank Dr. Pac-Man.

Dr. Pac-Man — as he is known in the video game industry — is Tom DeFanti, a skinny computer whiz who could easily be mistaken for one of his computer sciences students at UIC's College of Engineering.

DeFanti is also a prominent expert on video games. Dr. Pac-Man emerges when his knowledge of the games and the computer programs that run them is needed in the legal arena, "to provide expert testimony on knock-offs of Pac-man."

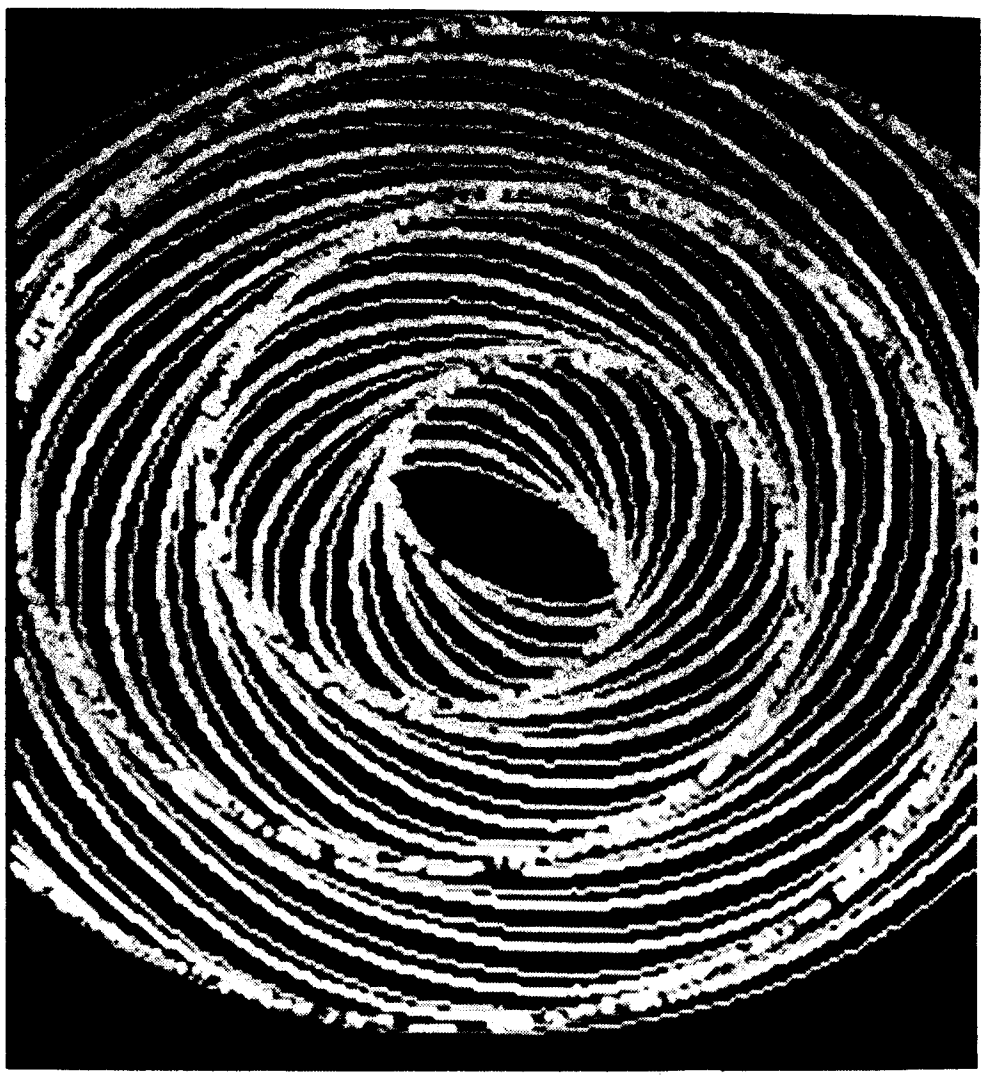
Tom DeFanti creates computer software. He works in rooms jammed with printouts and posters. There he devises computer languages and programs that "tell" computers what steps to take to achieve a certain end. His instructions result in the computer generating intricate drawings or patterns of a type known as computer graphics.

Or, as he puts it, "What I do, essentially, is make it possible for artists and educators to use computers to draw pictures."

The impact of this work extends far beyond the classroom, even beyond video games. DeFanti's most famous non-educational project is surely the movie "Star Wars," for which he and co-worker Larry Cuba created many of the computer-generated special effects. Some of them, in fact, have since turned up on video games.

But "Star Wars" was just the begninning. As computers become more accessible — cheaper to buy, easier to use — computer graphics are turning up everywhere. The designs on these pages and on the cover of the *Chicagoan* are computer-generated. So are more and more of the images we see in advertising. Consider, for example, auto commericals in which a three-dimension line-drawing of a car shows all its sides by rotating on an axis. That's computer graphics, too.

For DeFanti, it all started with Grass, a computer language that he developed during graduate school at Ohio State University. After finishing his Ph.D., DeFanti came to the University of Illinois at Chicago as a joint acquistion of the chemistry and (then) information engineering departments. He worked on computer-aided instruction systems



and developed links with other departments.

One that proved especially fruitful was with the art department, where art and technology were being combined by Dan Sandin on an image processor — a programmable machine that rings an amazing variety of changes on any image, from shading its colors to turning it unrecognizably abstract.

DeFanti's rapport with like-minded artists is "very strong," he says, and has led to productive relationships with other institutions. "There's such a rich artwork here [in Chicago], and we've built quite a reputation here with people at the Art Institute, the Chicago Editing Center, the [video] game people," says DeFanti.

It has also led to an "unofficial" graduate program between the departments of art and information engineering that deFanti, Sandin and Art/Design faculty member Gunther Tetz have nurtured over the past four years. Numbering seven to 10 students at a time, "it teaches engineers how to deal with visuals and art students how to deal with technology," DeFanti explains.

And that's what DeFanti is here to do. "I really like to teach. My interest is in developing educational tools — it's what I was hired to do and I still find it a real challenge. Besides, I need people to test among, and here I've got my students."

Not that his guinea pigs mind. What they learn from DeFanti, he says, are "practical survival skills that allow people to go out and work in the computer world, primarily on a non-theoretical level, so people get jobs where they *do* something. After nine years of teaching, I've seen a real impact on a couple of thousand students. And, since our students live at home and it never occurs to them even to move out of the neighborhood, that impact extends through the city of Chicago."

DeFanti also likes his students' tremendously varied backgrounds. "My students prove that economic circumstances are never indicative of one's intelligence. Some of them are very brilliant, some are real dodos — you get the highest highs and the lowest lows. They have jobs, they're almost all over-extended, and they're all trying to graduate *this* quarter, so it's hard for them to get stuff done on time. But they tend to be goal-oriented, not bubbleheads, and they're less cynical than students elsewhere. Sure, certain students only do the bare minimum, but others really enjoy learning and do ten times the work they have to do."

Even the facilities come in for a kind word: "This place has a lot of benefits, too. The physical facilities are quite good; I do a lot of traveling, and from what I see, the stuff is better here."

In academia, of course, hard times have been especially hard, and not even the computer people have escaped. "We're working now with 25 cents on the dollar, compared to when I came here in '73," DeFanti says. "Teaching is tough under those circumstances. This is equipment intensive work. We have 600 students on a computer system that would serve eight to 16 people in industry. It'll be doubled soon, but that's still a difficult situation. And yet we have the best computer access among universities in the Chicago area.

What happened to the bright future of computers in education? The answer is simple, and it's the same thing that's happened throughout higher education: the money dried up.

"Over the past 10 years," DeFanti says, "universities have gone from leading research to attempting to teach the history of computers. Academic computers have gone down the tubes. Nobody wants to teach because there's no money, in salaries or equipment. It used to be that teaching had other benefits — the state of the art research, for one. Well, grant money [to fund research] is mostly military these days. And someone with a master's degree can go out and immediately make more money in industry than I do after teaching nine years. People say industry is eating its seed corn."

And yet, he admits, "it's hard to talk about eating seed corn when you're hungry. This country is just not interested in education. At universities, quality education is only given lip service. And my students can buy better equipment with their allowances that we can provide at this university. Americans get mad and wonder what happened to good old American know-how. Well, what do they expect? Giving tax breaks for private companies to take over research is not going to help universities survive. Or governments, either."

Nevertheless, the technology continues to develop — and that's where video games come in. DeFanti considers the games "an early example of post-verbal communication.

"There's a tremendous amount of interacting between the player and the computer," he explains. "It's like when you're driving down the street, there's a tremendous interaction between you and the street. Same thing with the games, but at maximum human and computer speeds."

That kind of sophistication costs — but these days, it's dirt cheap, DeFanti points out. "The games cost maybe $3000 — the home ones, $150 — and they have features that are more advanced than what people use at work."

Technology for what people use at work — word processing, information management and retrieval — is evolving fast, too, but its reception hasn't been as enthusiastic as that for video games. DeFanti figures that's because it's just too human.

"In office automation, people try to duplicate the idiosyncratic systems they already know, which is a waste, and they underestimate what can be done. That's what killed word processing for a long time. I've been a booth tootsie at industry shows and heard these guys say, 'My girl can't use a computer.' Well, she plays video games, doesn't she?"

It's a natural progression, and beyond it are much greater changes. "There are a lot of things you can do much better out of the home," says DeFanti, who does much of his own work at home.

> **"What I do is make it possible for artists and educators to use computers to draw pictures."**

"Software's creative, like writing screenplays, and nearly everyone [who creates software] works at home. There's no office politics, which saves a lot of time and energy, and you don't worry about who has the corner office."

But doesn't working at home lead to isolation? Not according to DeFanti, who regards happily the "amazing community" that has developed among his collegues and current and former students.

"There's an 'us-against-the-world' attitude that **keeps us hanging together," he says. "We've *gotten national recognition, but not government*** money — which at least means we're not spending our time mapping civilian populations to be exterminated. This kind of community is only possible because of voluntary help — we all do our time, help each other, fix equipment. Generally, people are extremely cooperative, and there's a real good energy that I don't see in labs that are funded well."

The community extends to the School of the Art Institute in Chicago, where a former DeFanti student, Frank Dietrich, teaches. Others are involved professionally in video, working in industry or in educational applications. "People are just getting into the cycle, and most of them are doing basic technology. When you see all these people continuing to work in the field, that's rewarding," DeFanti says.

It's one reason he hasn't fled academia for industry. Another reason is that he's able to make time for a couple of related interests. One of these is SIGGRAPH — the Special Interest Group in Graphics — an organization of some 18,000 computer-graphics people that DeFanti chairs. He also has formed his own corporation, Real Time Design, which develops computer software (and allows him to "pay grad students a living wage").

There's another reason DeFanti stays: his freedom. "One reason I like academia is it's the only situation where the people who make the decisions do the work. I get to decide what I want to do, then I do it — the grunt work, everything.

"Of course, I get other offers. But at least the U. of I. is getting more entrepreneurial now. They should be spearheading production of materials for primary and secondary education. There's all kinds of pressure from high schools. They're happy to have someone provide packaged educational materials.

"Anyway," he adds optimistically, "I'm convinced something will happen. And I'm sticking with it."

Susan Figliulo ('76) is a copy editor in the features department of the Chicago Sun-Times *and a frequent contributor to the* Chicagoan.