

## Carl Machover Symposium

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Michael R.  
Macedonia

Fraunhofer  
Center for  
Research in  
Computer  
Graphics

Someone in my group said, “Machover is here.” Our heads turned to look about the crowded room, but we couldn’t see him. Yet we could hear that wonderful laugh and see the gathering coming alive.

We were there in Boston—about 50 of us—on 6 April 1997 because the Computer Museum hosted a symposium honoring Carl Machover. Carl celebrated his 70th birthday with friends and family from across the world, including several colleagues from Japan, Germany, Italy, and Britain. With his cousin, Morry Alter from WCBS in New York, as the master of ceremonies, Carl received honors and praise from a wide spectrum of computer graphics associates.

Carl Machover has played an essential role in the field of computer graphics as teacher, mentor, and businessman. His contributions extend back to the early days of the technology, when he was executive vice president of Information Displays in the 1960s. Since then he has nurtured a young industry and technology through tireless work and productive friendships.

Besides being a regular presenter at ACM Siggraph, Carl has served as the president for the National Computer Graphics Association and the Society for Information Display, and as the Chief Old-Timer for the Computer Graphics Pioneers. He is president of Machover Associates, a consultancy for computer graphics users, suppliers, and investors. His *CAD/CAM Handbook* and the *C4 Handbook* are widely used references in the field. He has a special place at *IEEE CG&A* as a member of the editorial board and a frequent contributor (every issue since its birth in 1981, as new prod-

ucts/hardware editor, guest editor, and author).

At the symposium, Carl was feted by Gwen Bell, founder of the Computer Museum; Bertram Herzog, editor in chief of *IEEE CG&A*; José Encarnação, director of the Fraunhofer Institute for Computer Graphics in Germany; Andries van Dam, director of the NSF Science and Technology Center for Graphics and Visualization; Nicholas Negroponte, director of the MIT Media Laboratory; Pamela Blair, office manager for Machover Associates; and Steve Cunningham, president of ACM Siggraph.

Negroponte recalled how he, as a new professor at MIT, first sought Carl’s advice in the 1960s. Cunningham gave Carl a plaque showing the group’s appreciation for his many years of service to Siggraph. Encarnação presented a certificate from the Eurographics Association and recalled Carl’s contributions to fostering understanding between the US and European graphics communities. Herzog handed Carl a Certificate of Appreciation from the IEEE Computer Society for services rendered on the editorial board of *CG&A*.

However, the greatest honors came from Carl’s family. Two of his children, Julie and Tod, put to words and music their feelings about Carl in a biographical tune called “He’s Our Dad.” You can download the song from Carl’s birthday homepage, <http://brainop.media.mit.edu/~carl>. At the site are pictures and stories gathered from his friends to honor Carl’s work and his life, including the famous caricatures of himself.

Happy birthday, Carl! ■

One of Carl  
Machover’s  
self-caricatures



## CG&A Wins the Bronze

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The Society of National Association Publications (SNAP) awarded *IEEE Computer Graphics and Applications* with a Bronze Award in the Scholarly Journals, General Excellence category as part of its 1997 SNAP Excel Awards competition. This is the 15th year SNAP has sponsored the event, and this year about 800 association-based publications participated. *CG&A*’s editor-in-chief Bertram Herzog and managing editor Nancy Hays accepted the award at Association Publishing 97 in Washington, DC, June 26. ■

## New 3D Technologies Take Shape

Recently, researchers have found new ways to expand the boundaries of 3D graphics. Alexander Migdal, a former Soviet physicist, discovered that he could substitute algorithms with real-time geometry for computer hardware (*WSJ*, April 30, 1997). His formulas rank data from images based on order of importance. This method lets computers render each image with the least amount of computer processing power, which helps cut the cost and increase the speed of performing such tasks. For instance, the technology could let a computer display different detail levels of an image, depending on where the image is positioned on screen. If it's near the front, the computer can render it at a higher resolution, while leaving the background images at a lower resolution.

Migdal's company, Real Time Geometry, was bought by MetaTools in December. MetaTools plans to license the technology to hardware and software companies and integrate it into their own products.

Paul Debevic, a University of California at Berkeley computer science student, discovered he could create photorealistic models of cars from still photographs (*Los Angeles Times*, May 12, 1997). To do this, he uses Facade—software he developed—to model a scene by matching outlined portions in a photograph to edges of geometric blocks, such as boxes. Using a technique called photogrammetric modeling, Debevic's software computes each block's shape and position and snaps the model to fit the photograph. To make the scene photo-

realistic, the original photographs are projected onto the reassembled geometry.

Debevic submitted a film to Siggraph 97 based on this technology, and Warner Digital Effects flew him to Hollywood to help make Gotham City look more realistic for the film "Batman and Robin."

At the University at Buffalo in New York, researchers Christina Bloebaum, an associate professor of mechanical and aerospace engineering, and doctoral candidate Eliot Winer developed a new computer visualization method (<http://www.buffalo.edu/news>). Called graph morphing, the method lets designers see how changing a variable in a multidimensional design space will affect the product's overall design.

Graph morphing can be done in 2D and 3D. In 2D, only two design variables can be plotted. The other variables are assigned to and controlled by switches, which act like scroll bars. When a designer changes one of the variables, the on-screen image morphs to accommodate the change. As additional changes are requested, the morphed image illustrates what further modifications will do to the design. With VRML, graph morphing can show the effect of trade-offs in the engineering phase, such as how extending a wing on an aircraft would affect other variables like lift and drag. Plus, it lets researchers working on the same product in remote locations collaborate with others simultaneously over a computer network or the World Wide Web. ■

## X-Rays Go Digital

Despite advances in computer graphics today, X-ray technology has lagged behind in the race to go digital. But that's changing thanks to researchers at the Xerox Palo Alto Research Center (PARC). They've been working on refining X-rays for almost 20 years, said Robert Street, a physicist at PARC since 1976 (*San Jose Mercury News*, May 12, 1997). In 1992 Xerox PARC launched a spin-off company called dpiX to transform their research of amorphous silicon—the basis for digital X-ray technology—into commercial products.

A vapor-like cousin of silicon, amorphous silicon is engineered to form an array of transistors and photo diodes. When deposited on glass, it acts as a substitute for a single-crystal silicon substrate. This array, which can find, record, and send varying degrees of light and dark, replaces traditional X-ray film. The images can be transmitted directly from the array to a computer.

In June dpiX announced the FlashScan 20, an 8×10-inch thin-film transistor sensor array, based on amorphous silicon (*Electronic Engineering Times*, June 2, 1997). The sensor has a 127-micron pixel size with a resolution of four line pairs per millimeter. Within the next couple of years, the company hopes to increase the size of the imager to 14×17 inches, the standard for full-size X-rays. ■

### Tech Notes

- England's Defense Evaluation and Research Agency (DERA) developed a flat TV screen that can reportedly be hung like a painting. The screen uses ferroelectric crystals that operate at different voltages and alignments to display moving images. DERA is also working on screens that can be folded into scrolls and displays that can project 3D images (*London Observer*, May 9, 1997).
- Pennsylvania State University professor Gordon Garmire designed an X-ray camera that can view high-energy objects in the galaxy. NASA will install it on its Advanced X-Ray Astrophysics Facility, which will be launched into space on the Space Shuttle in late 1998 (<http://www.science.psu.edu/alert/AXAF.htm>).
- Prosolvia, a VR software developer, and Innovata, an engineering consulting company, provided technological support in creating Wright State University's VR research facility called Veritas (Virtual Environment Research, Interactive Technology, and Simulation). Veritas is housed at Wright-Patterson Air Force Base in Ohio (<http://www.prosolvia.se>).
- Microsoft is reportedly developing a technology for its Windows Terminal, a desktop machine with no disk drive or stored programs. A Windows NT server would execute the software. Microsoft's concept closely mimics that of its competitors' network computer model (*WSJ*, April 7, 1997).

## Throwing in the Chips

3D seems to be everywhere these days, causing those in the graphics chip business to fight for a piece of market share. With Intel dominating the field, competition proves fierce. Rockwell Semiconductor and S-MOS Systems announced they will abandon the 3D graphics arena, while S3 said it will shift its focus away from PC 3D products to enter the PC home theater market (*Electronic Engineering Times*, June 2, 1997).

Although Rockwell's MediaStream processor was billed as one of the first chips sets to integrate audio, video, and graphics when it was introduced in 1994, the company lagged behind when the market became 3D-oriented. Plus, according to Geoff Ballew, an analyst with Dataquest, the MediaStream processor incorporated audio encoding, which resellers were not ready to accept. Rather than spending extra money to try catching up with the competition, Rockwell pulled its 3D offering.

S-MOS sold its graphics chip business to Reality Simulation Systems, because like Rockwell, it encountered a similar fate of slow technology and not enough resources. Instead, S-MOS will focus on its 8-bit microcontrollers, ASICs, and LCD drivers.

Even Microsoft is backing way from its Talisman 3D graphics reference design (*InfoWorld*, May 26, 1997). They cancelled it because Microsoft found that the customers they hoped to serve—graphics chip makers—

could manufacture graphics components faster and at less cost without the design. Instead, the company will license the technology to chip makers.

NEC, however, is betting its PowerVR 3D graphics accelerator—which does not support 2D acceleration—will overcome obstacles its competitors have faced. To make PowerVR a brand name, NEC is investing \$9 million in marketing and advertising, plus another \$16 million to develop content that supports PowerVR (*Computer Reseller News*, June 2, 1997).

According to NEC's product marketing manager Charles Bellfield, the PowerVR architecture reduces the chip count and additional memory required for 3D rendering. This enables polygons to be rendered in real time. The PowerVR processor reportedly offers as much as 1.5 million textured and shaded polygons per second and up to a 70-million-pixel-per-second fill rate. In fact, Bellfield said NEC was able to reduce its chip pricing by \$20 for the PowerVR processor to an OEM-level pricing of \$30. ■

## State of the Art Opens

To showcase the latest in digital art and technology, Intel Europe, together with Art Concepts of Germany and Superscape VR, opened State of the Art, an interactive, virtual 3D gallery located at <http://www.intel.com/english/art> (*Business Wire*, June 3, 1997). The inaugural exhibit features contributions from artists such as Isa Genzken, Anton Henning, and Claus Goedicke. All artwork is accompanied by the artist's biography as well as commentary from art experts.

The gallery features many elements to enhance visitors' virtual reality experience. In the Your Own Personal Gallery room, PC users can show off their own works of digital or photographic art to the world. A room for visitors that have a Pentium processor with MMX technology can find out more about such computer lighting techniques as Gouraud shading and z-buffering. The Art Corridor delivers paintings to visitors on conveyor belts. For those who are Escher fans, the Art Cube—inspired by the artist's work—completely surrounds visitors with art.

To help users navigate through the gallery without waiting for a long time for files to download, Iterated Systems provided State of the Art with an advanced fractal decompression technology. The method compresses high-resolution images to small file sizes.

State of the Art is available to all users running Windows 95 or Windows NT plus Netscape Navigator or Microsoft's Internet Explorer. A Pentium processor running at 133 MHz or above is recommended. Users with MMX-based Pentium processors can take advantage of advanced visual effects on the Web site. ■

### Business Briefs

- Silicon Graphics signed an agreement to buy ParaGraph International and will launch Cosmo, a new 3D software business unit (*Computer Reseller News*, June 3, 1997).
- Synthonics Technologies launched 3D DiagnosTx LLC, a subsidiary that will design software for making photorealistic 3D models and images for dental and medical practitioners (<http://www.synthonics.com>).
- Boeing reportedly will invest up to \$100 million in Teledesic, a satellite venture backed by Microsoft to build a \$9 billion satellite network for global Internet access (*Los Angeles Times*, April 30, 1997). NEC signed a joint venture agreement with Shanghai Hua Hong, a Chinese partner, to build a chip manufacturing plant in Shanghai (*Reuters*, May 28, 1997). The *Wall Street Journal* (June 3, 1997) reported that Novell and Netscape have completed their joint venture, Novonyx, to sell Internet software to corporations.
- Ingram Micro, a computer parts and software wholesaler, announced it will acquire Intelligent Electronics' reseller network division for \$78 million (*Los Angeles Times*, May 1, 1997). Meanwhile, Oracle will purchase Netscape's spun-off Navio Communications unit for \$60 million (*TechInvestor*, May 19, 1997).
- Through distributors in third countries, Sun Microsystems will sell encryption software licensed from Russian-based Elvis+ to its overseas customers (*WSJ*, May 19, 1997). *WSJ* also reported that Pretty Good Privacy received approval from the Commerce Department to sell its encryption software to foreign subsidiaries of 100 large US companies (*WSJ*, May 29, 1997).