March 9, 1994

UNC signs licensing agreements

Computer scientists at the University have signed licensing agreements that will allow two companies to incorporate patented UNC-CH graphics devices into virtual reality machines.

Division Inc., headquartered in Redwood City, Calif., and Ivex Corp. of Norcross, Ga., each will pay the University $250,000. Division, which produces complete virtual reality systems, has opened an office on Franklin Street in Chapel Hill to be closer to the researchers.

Patent Royalties on the Rise

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Ivex primarily builds visual systems for flight simulators. It, too, may set up an office near campus.

"This is an exciting development because these licensing agreements potentially will be the most lucrative the University has ever signed," said Linda L. Spremulli, interim vice chancellor for graduate studies and research. "We are particularly pleased that an office has been established here in Chapel Hill because that will benefit the local economy and North Carolina's."

Future royalties will be a percentage of sales that Division and Ivex record, she said. Both companies will use the Pixel-Planes 5 system already in existence and the PixelFlow system now being devel-

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oped.

Henry Fuchs, Federico Gil professor of computer science, began the Department of Computer Science's Pixel-Planes work 14 years ago. Since then, John W. Poulton, John G. Eyles and Steven E. Molnar have made key contributions to the technology and are co-inventors of the systems.

The co-inventors decided that because of other colleagues' contributions, more than 20 faculty, staff and students within the department will receive a share of royalties.

"We couldn't have done this project without the efforts of our many colleagues," Poulton said.

"Many people consider the University of North Carolina at Chapel Hill the world leader among universities developing interactive computer graphics," Poulton said. "The Pixel-Planes 5 system, which we introduced in 1991, still is about twice as fast as anything else on the world market and is considerably more adaptable for different uses. When completed, PixelFlow will be at least 10 times faster and also will be very adaptable."

The companies take UNC-designed computer chips and incorporate them into circuit boards that then go into "industrial strength" personal computers and flight simulators, Poulton said. Pictures they create are three-dimensional and change in real time as viewers move their heads or walk around.

Such virtual reality devices are far more sophisticated than video games, which present only two dimensions and require tricks to give the impression of three dimensions, Poulton said.

The UNC-CH scientists have specialized in what is called "rendering." They take numerical models of objects or structures and create pictures of them from thousands of tiny polygons, much as pointillist painters in the 19th century created pictures from thousands of colored dots. Each dot on a video screen is known as a pixel.

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John Poulton, Co-inventor

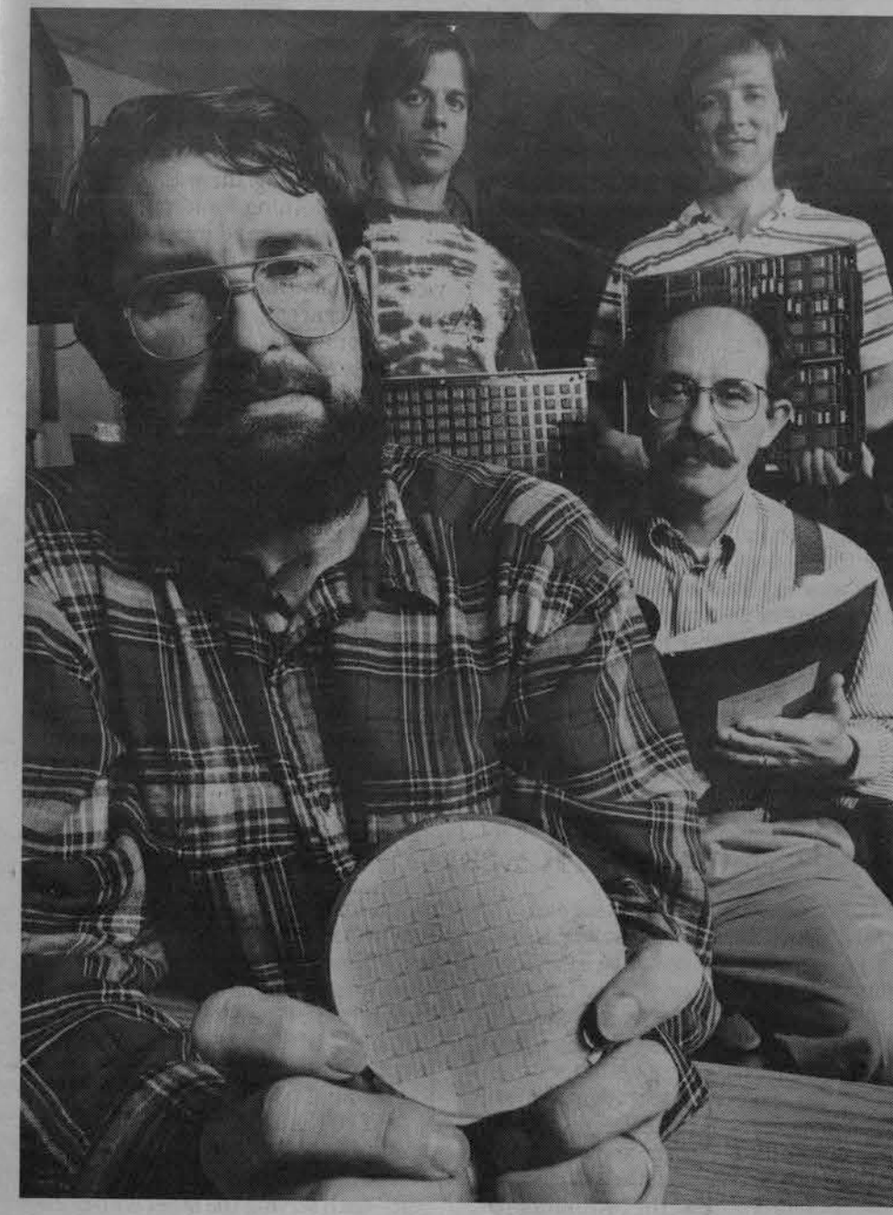
"What you have is a bunch of numbers in the computer that represent the corners of these polygons, and along with those is information about each polygon's color and which way it is facing," Poulton said. "The process that turns them into pictures is called 'rasterization.'"

So many calculations are needed to create graphic movement, however, that single computers cannot do them fast enough, he explained. As a result, the devices must use parallel arrays of computer chips that work together.

Fuchs' original idea for speeding up the movement was to combine raster processors with memory elements on the same computer chips. The concept, which Poulton called daring at the time, continues to work very well.

"There are a lot of smart people doing graphics work at the University," Poulton said. "Chapel Hill could become a center for this industry, which clearly is a growth industry. That Division has decided it is important to be here is a validation of what we have been doing all these years."

Major funding for the Pixel-Planes and PixelFlow has been provided by the Advanced Research Projects Agency and the National Science Foundation.



John Poulton, foreground, holds a semiconductor wafer that contains about 70 graphics chips developed by the Department of Computer Science for the Pixel-Plane and PixelFlow systems. Poulton and co-inventors Henry Fuchs (seated), John Eyles (standing left) and Steve Molnar recently signed what promises to be University's most lucrative licensing agreement to date. The license benefits the University and North Carolina by bringing business and revenues into the state.