In the summer of 2001, computer scientist Jim Chung phoned painter John Holloway from the Siggraph conference floor and told him about Bill Baxter’s physical-based 3D haptic painting system, Impasto. The system allows a user to manipulate a virtual paint brush and experience haptic feedback while producing an on-screen painting. Holloway was a graphics modeling specialist in the VR Content Development Department at RTI International in North Carolina. Chung, a colleague at RTI, suggested Holloway investigate Baxter’s system. “I must admit I was skeptical at best,” Holloway recalled. “I have worked with a number of paint applications but none of them offer the organic nature of paint. To date I had not encountered a computer graphics package that allowed me to approach the computer as a painter as opposed to a graphics artist. This is no small distinction in the art world.”

Baxter, a PhD candidate in computer science at the University of North Carolina at Chapel Hill, turned Holloway loose on the system. In the course of a few hours, Holloway went from skeptic to true believer in the possibilities of haptic painting. Through its virtual interface, Impasto successfully simulated a real analog painting environment. “I immediately recognized the importance and significance of this technology to my art and, I believe, the art world generally,” he said. “In haptic 3D painting we may very well be witnessing the beginnings of a new genre in the visual arts.”

Digital abstraction

Inspired by the vibrancy and movement of a tree outside his studio window, Holloway created TreeL3 (the cover image), using round and flat brushes of varying sizes in Impasto’s Paint Marker Mode. Building multiple layers of paint, he brought the piece through multiple evolutions and incarnations. “Herein lies one of the primary values in digital haptic painting,” he explained. “I am able to retain these many incarnations of a piece for future reference as separate files. This piece has gone through twenty such variations.” Holloway explains that the staccato nature of the strokes and their direction are intended to lead the viewer around and into the piece. “The manipulation of their strokes is intended to have the dual affect of leading the viewer’s eye but also providing the only allusion to a world beyond the tree, representing the movement of the surrounding atmosphere and its effects on the tree world.”

Varieties of changing light over time inspired the palette Holloway chose within Impasto and the color was a gut response to what he saw at a given moment. Holloway says his philosophy solidly falls in the abstract expressionist tradition and he paints to express the emotion of the moment, rather than to articulate a political viewpoint. “What I attempt to express in my work is generally the intangible, a fleeting glance through the doors of perception that I am trying to objectify as quickly as possible.”

A walk in the woods at sunset inspired Sunset Walk (see Figure 1). Holloway describes the image as “a study of the riot of color in a sunset as seen through a forest with rock outcroppings created with Impasto.” In the system, he used exclusively flat brushes of varying sizes and explored the delineation of edge juxtaposed to the manipulation of surface.

Holloway also created Ochre Abstraction and Friday Spin (see Figures 2 and 3) with Impasto. For Ochre Abstraction, Holloway again used the system’s flat brushes and explored surface building, manipulation, and texture within a particular color range. “The surface qualities I was able to achieve here were a direct result of my response to the mechanical dimension the haptics provided,” he said.

The thrill of finally being off the clock after a long
work week inspired *Friday Spin*. This time around, Holloway emphasized symbolism and expression rather than surface. “As the piece progressed it grew rather dark as I began to explore not only the freedom of being off the clock but acknowledging those issues and responsibilities that remain when one is feeling free.”

**Haptic practice**

Holloway received a bachelor of fine arts in painting from the University of Cincinnati in 1981 and practiced as a full-time painter for more than a decade. After returning to school in the early nineties to achieve an associate of applied science degree in scientific visualization and C++ programming from Wake Tech Community College in Raleigh, North Carolina, he wound up in the Technology Assisted Learning Program at RTI. Because of his understanding of data sets and object-oriented graphics programming, RTI pegged him as an artist who could work alongside the engineering staff.

But Holloway does not consider himself a scientist or an engineer. “I have worked with scientists for some time now and feel confident that I know the difference,” he said. “Quite simply I possess no advanced degrees. I have an avid interest and passion for digital technology but I am first and foremost an artist, and an analog artist at that.”

When it comes to haptic painting, Holloway sees an unlimited level of abstraction that is not available in the analog world, and he believes that haptics in general is of immeasurable value to the digital painter. For purist analog painters who disparage digital art, Holloway has another angle on the whole thing: “The metaphor to the analog world that haptics can provide in the interface can facilitate a more fluid psychological connection to virtual environments. The ability of the artist to transfer intuitive understanding and instinct fluidly through the interface is of ultimate value.”

He believes that through haptic painting, like every technological innovation in the arts, the scientific community has provided artists with a new creative environment in which to work, offering limitless new possibilities for artistic expression, but at the same time the artist is presented with a brand new set of dilemmas. As with any new art and technology endeavor, aesthetic issues concerning intellectual property and the final presentation of the completed work remain.

**The future**

With the rapid increase in CPU speed, Holloway says the genie is out of the bottle when it comes to haptic painting. It might not be household practice for a while, but this is just a matter of sorting out the issues of intellectual property and access to tools.

“As to future projects, my greatest hope is to find an opportunity to paint in a fully immersive haptic environment,” he said. “A fully immersive environment would provide the artist the opportunity to begin to explore the richness and possibilities of pure haptic 3D painting. Within such an environment the artist could conceivably reach toward levels of abstraction on a scale hardly dreamed of by artists of the last century. Such a creative environment may also afford the viewer of a completed work or even the creative process a chance to experience the motivations and reasons why the artist is doing this in the first place.”

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