

Perspectives on In/stability



Stability Isn't Everything It's Glitched Up to Be: An Interview with Jamie Fenton

JONCATES, JONATHAN KINKLEY, AND JAMIE FENTON

Artist, game designer, and engineer Jamie Fenton (born 1954) created *Digital TV Dinner* in 1978 in collaboration with Raul Zaritsky and Dick Ainsworth. That work is now widely cited as the earliest example of Glitch Art, which intentionally creates malfunctions, interruptions, or their effects in digital and analog formats. For this project, Fenton glitched the video game console and computer platform Bally BASIC Arcade (or Astrocade), which she herself helped develop and for which she created games. In 1977 she had developed the Bally BASIC ROM operating system as an employee of the pivotal video game engineer and arcade contractor Dave Nutting Associates, and one year later she created (with professor Tom DeFanti and programmer Nola Donato) one of the earliest graphics programming languages, BASIC Zgrass, for the Bally Home Library Computer.^[1] Fenton also designed the hit 1981 science fiction arcade game *GORF* during her time as artist and programmer for Chicago-based Midway Manufacturing, a worldwide leader in the arcade cabinet market. Four years later, in 1985, she developed the software that would become MacroMind Director (later Macromedia Director, and then Adobe Director), a profoundly important

application that enabled an entire genre of new media art and games through CD-ROM-based interactive art, internet-based web art, and Shockwave games, which led to Flash games. Notably, Fenton also worked with renowned computer scientist Alan Kay, and later Amazon, as well as many other companies, all while pursuing her own creative projects, from model train building to new media and Glitch Art.

As a designer and developer of the technological systems themselves, Fenton glitches her own systems, expertly playing with their boundary states and pushing against their borders to capture unpredictable outcomes. Based in Chicago for much of her career, she has also contributed considerably and consistently to the formation of new media art communities in the city, especially in the 1970s. As a transgender woman, transitioning from male to female in the mid-1990s, Fenton has been active in transgender communities while working at the highest levels of technology development, computer programming, and creative software. As she notes in the edited transcription that follows, her transition marked a turning point in both her life and career.

The largest scholarly inquiry into Fenton's work to date was conducted in conjunction with the exhibition and catalogue *Chicago New Media*, curated and written by jonCates. Organized by VGA Gallery and exhibited at Ars Electronica (September 5–9, 2019) and Gallery 400 at the University of Illinois, Chicago (November 1–December 15, 2018), *Chicago New Media* traced the connections among new media, academia, and industry through the lens of Fenton's career. The exhibition featured both Fenton's *Digital TV Dinner* and Whitney Pow's *Digital TV Breakfast* (2018), a playable Glitch Art game that re-mediate *Digital TV Dinner*. For the interview that follows, Fenton spoke with jonCates and Jonathan Kinkley, curator and assistant curator (with Chaz Evans), respectively, of *Chicago New Media*. Additional quotations from Fenton are drawn from the international *Chicago New Media* Symposium held on November 1, 2018, at Gallery 400.[2]

jonCates and Jonathan Kinkley: Let's start with the *Chicago New Media* exhibition on the night of November 28, 2018, when you played Whitney Pow's Glitch Art game *Digital TV Breakfast* (fig. 1), which was based on your seminal *Digital TV Dinner* from 1978.[3] What is it like to experience an art piece that is inspired by your work?

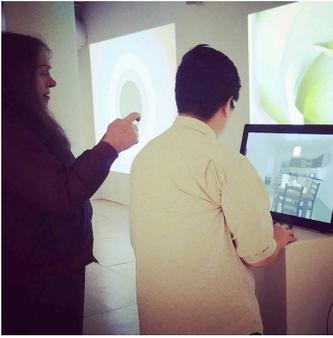


Fig. 1

Artists Jamie Fenton (American, born 1954) and Whitney (Whit) Pow (American, born 1988) playing Pow's video game *Digital TV Breakfast* (2018), which was inspired by Fenton's video *Digital TV Dinner* (1978). Photograph by jonCates.

Jamie Fenton: I was delighted to meet Whitney and see this work—I had just moved back to Chicago after living on the West Coast for thirty years and it was super cool. The exhibition really put the whole era and all these different groups from that time in context. With *Digital TV Dinner* (fig. 2), we discovered you could pull the cartridge out of the Bally Astrocade while it was running and something would happen!^[4] It wouldn't do any damage because we had put in enough protection. The game would still make legal NTSC—I mean, if you turned the power on and off, of course, you'd get an honest-to-God glitch.^[5] But if you just took the cartridge out while executing code—well, whatever that code was doing, it would keep on doing it. It would fill the screen with some sort of pattern. Usually it would look like a memory dump of some of the memory of the system, but it could be other things as well. What we discovered is something like LSD, or as though we put some electrodes into your brain and just gave you a random shock. In other words, you could take the cartridge out while the game was on and this would cause all kinds of interesting things to happen. So there's Glitch Art!

Fig. 2

Jamie Fenton (American, born 1954), Raul Zaritsky (American, born 1944), and Dick Ainsworth (American, born 1936). *Digital TV Dinner*, 1978. Video; 2 min. 42 sec. Video courtesy of Jamie Fenton.

JC and JK: It's important for people to understand that you are the person who created *all* of it: the source code, the hardware, the glitch. You understood it at a very fundamental level, building the system that you are then manipulating and exploiting in ways that could surprise even you. Before you made *Digital TV Dinner* you had developed the Bally BASIC for the Astrocade. How did that come about?

JF: I had dropped out of college to be a video game engineer and was employed by Dave Nutting Associates, first to do pinball machines. Then I switched over and started coding video games.^[6] My first video game for Dave Nutting was *Blackjack*, which was a monument to Las Vegas even though the game never shipped (fig. 3). I did a couple of video games like *280 ZZZAP* and *Checkmate*, both of which were relatively successful. They each took two months from start to

finish, but nowadays two months is the length of a quality assurance cycle of a game! Then we thought, “Wouldn’t it be nice to make a game for the home,” so we started working on this thing that eventually was called the Bally Astrocade (fig. 4). We made two fateful decisions when we designed this hardware, doing two things differently than all the other game and hardware designers. First, we didn’t insist that you turn the power off before you insert a cartridge; we actually put circuits in, called buffers, that tolerate having a memory card to the game cartridge inserted or removed. Second, we made the video that came out of the Bally Astrocade NTSC legal so it could be recorded on any video cassette recorder. You could actually just hook it up to the television transmitter that we broadcast with in the United States.[7] No one else’s games did that. I was good at optimizing and coming up with strange ways of doing things that you would never expect. I did this by imagining and adopting the psychology of someone who was *living inside* the computer.

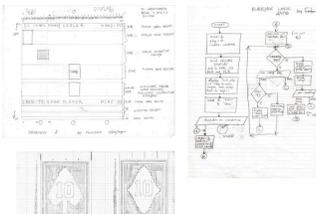


Fig. 3

Jamie Fenton (American, born 1954) and Dave Nutting Associates (American, founded 1974). Development notes for the video game Computer Blackjack (1976). Collection of Jamie Fenton. Photograph by Jamie Fenton.



Fig. 4

The owner’s manual for the Bally Arcade Video Game System (also known as the Bally Home Library Computer, Bally Professional Arcade, or Astrocade), introduced in 1977 by Midway, the video game division of Bally, featuring Bally BASIC (the ROM-based operating system for Bally Astrocade), which Jamie Fenton developed and project managed for Dave Nutting Associates in 1977. Collection of jonCates.

The Bally Astrocade was quite ahead of its time. It had 24-color graphics memory, 160 by 102 pixels, with 2-bits per pixel, which at the time was considered profoundly powerful. We competed with the Atari 2600, which had much less memory and much less graphics power. Ours was actually a pretty advanced game system—the first to have an actual frame buffer, which no other game of that era had until they released the Nintendo NES.[8]

Around the same time that we were starting to complete the design of the circuits, I flew out to California for a video game conference. When I was there I found a book called *Computer Lib/Dream Machines* by Ted Nelson.[9] I read it on the airplane ride back, and there was so much about Tom DeFanti that I became fascinated by what he had done.[10] I went in and met Tom DeFanti and got a tour of the Electronic Visualization Lab at the University of Illinois, Chicago. There was the

Vector General and his PDP-11 and things like that.^[11] I decided to start taking one of his classes on advanced computer graphics, but I never paid any tuition—I just crashed the thing. That got me in closer with the gang there, and Tom and I became friends. And he, of course, became aware of the work I was doing at Bally/Midway, so he eventually got pulled into helping us, and I got to work with him on a project called Zgrass.^[12] I took a version of the BASIC language that somebody else had written and then adapted it so it would run on the TV and make simple animations—drawing boxes, circles, and letters. And I threw the whole thing together in two weeks and made a demo program, which students at the School of the Art Institute of Chicago were then taught for a couple of years afterward.

JC and JK: The most successful arcade game you developed is *GORF*, and there is an unpublished title known as *Ms. GORF*.^[13] Can you share a bit about your concept for these projects?

JF: The chips we designed for the Bally Astrocade had two modes: if you set it up one way it became a video game with a 4K frame rate buffer, and if you set it up another way it would have four times the bits and you could actually make a commercial game out of it. So that's when we made the RT1 system that was promoted by Tom DeFanti as an artistic computer, and I wound up creating *GORF* (fig. 5) and another game called *The Adventures of Robby Roto*. *GORF* started out as a *Star Trek* game and ended up a success, but *Robby Roto* was a flop, although it had a second life on the MAME system, which is a free video-game emulator that a lot of people use.^[14] The *GORF* character first appeared in a shooting-gallery, rifle-on-a-trackball game.



Fig. 5

The logo from the *GORF* arcade cabinet. Jamie Fenton (American, born 1954) for COIN, Bally/Midway (American, founded 1969). *GORF*, 1981. Video game.

The high-end version of the Astrocade chip set went into these games. After *Roto*, I did a follow-up game called *Ms. GORF* (fig. 6), sort of like *Ms. Pac-Man*. I hadn't seen the movie *Alien* yet, but the idea was set in outer space and *GORF* would fight this thing that was reproducing, like the reproductive creature from *Alien*. One of the things it would do is paint pixels, so a character could paint pixels that blocked your shots, and there you had a free-form strategy game. We worked on this for maybe a year, and I kept a video log of my progress. Eventually they decided to change to a new generation of hardware that wasn't recordable, and all the progress stopped being captured, which is unfortunate because the game was canceled. I drew a tombstone on the floppy disks with RIP and the date the game ended, and they're now at the Computer History Museum [in Mountainview, California]. I still have the *GORF* source code disks.



Fig. 6

Jamie Fenton demonstrating Ms. GORF in the television series *Wired In* (unreleased; produced by Tom Weinberg and Elan Soltés). Jamie Fenton (American, born 1954) for COIN, Bally/Midway (American, founded 1969). Ms. GORF, 1982 (unreleased). Video game. Courtesy of Media Burn Archive.

JC and JK: In 1984 you created another platform, MacroMind (the predecessor to Macromedia and Adobe), which was an entirely new, interactive way of making art, animation, and music. How did you pivot from video games to MacroMind?

JF: After *Ms. GORF* was canceled, I worked for a year or so porting games and writing code for the Commodore 64, and then the Macintosh came out. Marc Canter, Mark Pierce, and I all started MacroMind (fig. 7).^[15] The powerful idea that led to this came from my experience seeing *A Clockwork Orange* when I was seventeen, after which I made a timeline diagram of the movie—where each scene was, and so on—and tried to come up with a thematic analysis of the film. The diagram is very similar to the MacroMind VideoWorks (or MacroMind Director) timeline. I thought that if you can use a timeline to analyze a movie that somebody made, perhaps you could use a timeline to represent a movie you *intend* to make. Originally the program was called SoundVision and would let you do both audio and video production in one integrated environment with one integrated timeline. We'd actually started developing that, but we had to abandon the effort when we realized the limits of the Macintosh computer memory. So we split the program into MusicWorks and VideoWorks, and MacroMind turned into a big smash hit because it was a media production system that anybody could use to create animated stuff. And that, of course, made me very famous.

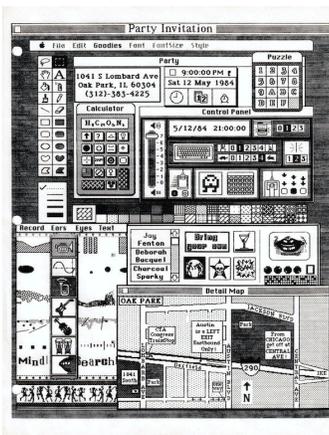


Fig. 7

A party invitation in MacroMind to Jamie Fenton's home in Oak Park, Illinois. The graphics in the lower left corner are from early design notes for a timeline editor (a now-common feature of video and audio editing programs that represents time on the X axis and, on the Y axis, channels describing what happens to a particular character, sonic instrument, or parameter). Collection of Jamie Fenton. Photograph courtesy of Jamie Fenton.

JC and JK: How did you first get into computers, and what other influences did you have?

JF: My dad taught me a little Fortran, and I brought the timeshare teletype computer home from math class in a suburb of Cincinnati. The first game I wrote for the computer was a version of craps. You'd get the sevens and elevens and all that sort of stuff you do in a craps game, and the program tracked how much money you won. And if you wound up running out of money, a loan shark would loan you more money and then threaten to break your legs if you didn't pay it back. So you can see I sort of got into computer games early on. At the time, I was the reject kid—too strange to fit in with everybody else. And what's funny was, in seventh grade everybody except me had already figured out that I was a girl in a boy's body. Eventually I decided to smoke cigarettes, grow my hair out, smoke grass, be a hippie, all those sorts of things. I hadn't figured out the transgender part at all. I knew I was bisexual, but I didn't know the trans part. I was very much a creature of the counterculture—I would put on the hippie beads and everything, which, of course, would turn out to be a very common pathway for many transgender people. It was a different time. Computers were different then; they hadn't permeated everything. People did well making elaborate software projects, but there was also room to do little games, to do everything themselves. It was quite a different world then ... a different world.

Banner image: Detail of fig. 6.

Notes

1. Tom DeFanti joined the faculty at the University of Illinois at Chicago (UIC) in 1973, cofounding the Circle Graphics Habitat (later renamed the Electronic Visualization Lab, or EVL) with Daniel J. Sandin. DeFanti had started developing his programming language GRASS (Graphics Symbiosis System)—a powerful computer graphics language—while doing his PhD under Charles Csuri at the Ohio State University. DeFanti's GRASS led to Zgrass, the language collaboratively developed by DeFanti, Fenton, and Nola Donato.
2. The *Chicago New Media* Symposium panelists included Christiane Paul, adjunct curator of new media art, Whitney Museum of American Art; Oliver Grau, professor for image science, Danube University Krems, and a founder of the field of media-art history; Ellen Sandor, artist and coeditor of *New Media Futures: The Rise of Women in the Digital Arts* (Urbana, IL: University of Illinois Press, 2018); Daniel J. Sandin, professor emeritus, UIC School of Art and Art History, and cofounder and codirector of UIC's Electronic Visualization Laboratory; Jamie Fenton, software developer for systems used by artists in the exhibition; Tom DeFanti, senior research scientist, Calit2 at the University of California San Diego, and cofounder and codirector of the

EVL; Sabrina Raaf, artist and associate professor at the UIC School of Art and Art History; and curator and organizer jonCates.

3. Whitney Pow researches, writes on, and teaches queer and trans histories of games, software, computing, and Glitch Art. Pow is an independent game designer and developer, and they are assistant professor of Queer and Trans Media Studies in the Department of Media, Culture, and Communication at New York University.
4. *Digital TV Dinner* (1978), Jamie Fenton and Raul Zaritsky (video) and Dick Ainsworth (audio).
5. NTSC stands for National Television Standards Committee, the group that originally developed the black-and-white and, later, color television system that is used in the United States, Japan, and many other countries.
6. Dave Nutting Associates, founded by Dave Nutting and Jeff Frederiksen in 1974, began working with Bally Manufacturing and Midway Manufacturing in 1975 and closed in 1984.
7. The significance of this innovation cannot be underestimated, as it is what allowed for the display, broadcast, and—most importantly for present purposes—recording of the signals sent from the system. This allowed for the preservation of the media, which is why we have access to this work today.
8. Computers utilize frame buffers to store frames of visual information that the computer displays, such as pixel information used in computer games. Frame buffer capacities, and thereby computers' resolutions, increased dramatically during the 1970s.
9. Theodore H. Nelson's self-published *Computer Lib/Dream Machines* (1974) is now widely understood to be "the most important book in the history of new media." See Noah Wardrip-Fruin and Nick Montfort, eds., *The New Media Reader* (Cambridge, MA: MIT Press, 2003), 301. Jamie Fenton was inspired by *Computer Lib/Dream Machines* to reach out to Tom DeFanti, who is featured in the book alongside Daniel J. Sandin. Nelson also taught as a lecturer at UIC from 1973 to 1976, and DeFanti and Nelson were roommates at the time Nelson finalized his book. Sandin, DeFanti, and Nelson worked together closely in the Chicago new media community, collaborating and connecting with Phil Morton, Bob Snyder, Jane Veeder, Gene Youngblood, and many others. *Computer Lib/Dream Machines* thereby served as Fenton's introduction to the Chicago new media communities, inspiring her to meet DeFanti and the others listed above. Although Nelson's book is widely known and respected, his work in the Chicago new media communities is not as well documented. Fenton's account in this interview provides insight on the formation of these communities.
10. Fenton cites additional influences and inspirations including Olivia Jack's software project

Hydra (2018–present), the film *Tron* (1982), the game *Lunar Lander* (Atari, 1979), the film *A Clockwork Orange* (1971), the game *Oregon Trail* (1971), and *The Whole Earth Catalog*, which was published from 1968 to 1971.

11. The Vector General, introduced in 1969, provided visual output to computers throughout the 1970s such as the PDP-11. (The Programmed Data Processor [PDP] was a computer manufactured by the Digital Equipment Corporation beginning in 1970.) Computer displays are now taken for granted because of devices with attached screens such as laptops and smartphones. When it was introduced, however, the Vector General provided new, powerful, and relatively affordable options to output computer-generated graphics onscreen. An example of computer graphics produced using a Vector General display (attached to a PDP-11) are the animated plans for the Rebel Alliance’s attack on the first Death Star in the original 1977 *Star Wars* film, which were created by artist Larry Cuba. This computer animation sequence was produced at UIC on the same system that Fenton references in this interview, and Cuba coded the sequence in the GRASS programming language created by Tom DeFanti.
12. See Tom DeFanti, Jamie Fenton, and Nola Donato, “BASIC Zgrass: A Sophisticated Graphics Language for the Bally Home Library Computer,” *ACM SIGGRAPH Computer Graphics* (August 1978), <https://doi.org/10.1145/965139.807366>.
13. *GORF* is an acronym for Galactic Orbiting Robot Force.
14. The Multiple Arcade Machine Emulator (MAME) emulates older computer hardware in software, making older computer environments available on contemporary computer systems by running, as software, older or obsolete hardware. Antique arcade video game systems are now emulated through MAME on contemporary computers. MAME is therefore especially important to the preservation of video game histories.
15. MacroMind developed MacroMind VideoWorks (the precursor to MacroMind Director) to run on the Apple Macintosh computer. This software became the primary method of creating an entire genre of early new media art and games: the digital interactive art variously called CD-ROM art or simply multimedia art.

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