indieVisions
FOR ARTISTIC TECHNOLOGISTS

Issue 13 June/July 1997

ALCHYMEIA by Shawn Brixey

Shawn Brixey is a graduate of MIT's CAVS/Media Lab and is currently Chair of the Cross-Disciplinary Arts Program at the University of Washington, Seattle, WA. He has exhibited art and technology works internationally. He has recently received San Francisco State University's first distinguished mentorship in new media, from the Institute for New Media. He will be taking up a 6 month residency in San Francisco this Fall.

ALCHYMEIA 1: THE ANCIENT ART AND SCIENCE OF TRANSFORMING ONE STATE OF MATTER TO ANOTHER 2: THE POWER OF TRANSMUTATION 3: THE SEARCH FOR IMMORTALITY THROUGH THE PANACEA, THE ANSWER TO ALL THINGS.

When it comes, it comes in a flash, like a shooting star. It is a moment that medieval alchemists might have conjured; a moment when nature is re-created, yet transformed. What appears in the alchemical waters is not some terrifying homunculus; instead, only tiny ice crystals. And yet these crystals represent an emulation of life. Appearing instantaneously in an electrifying explosion of dark blue water, the crystals have been genetically engineered.

Alchymeia is an installation that instead of constructing a simulated model of reality, creates a transmuted copy of that reality. It is art that grows from a preordained genetic blueprint. In this case the blueprint is not only my idea, it is *me*.

The crystallization process at the heart of *Alchymeia* is triggered at the atomic level by steroids derived from human urine. A synthesis of art, science and technology that creates a telematic scaling of the human presence, an extension of the human persona so removed from operational awareness, it becomes a virtual (imaginary) space. The installation is more than a technological proxy portrait, or a sustainable illusion of the artist; it *is* the artist, a re-embodied/re-mapped "clone" of the author.

Alchymeia was originally designed as a potential proto-type for large scale ice sculptures at the 1998 Winter Olympics in Nagano Japan. The intended seeds for growing the ice crystals are naturally occurring steroids from selected Olympic athletes. The exhibition premiered last Fall at the University of Washington's Jacob Lawrence Gallery, using my own body's hormones to produce the genetic material. An expanded version of *Alchymeia* will be exhibited in Chicago this September, as a part of ISEA97.

NATURE Snowflakes (ice crystals) in nature are precise atomic recordings of all the histories in their lifetime. Their elaborate structure instantly mirrors the most delicate change in physical environment. The microscopic shape of a crystal tells an exact and complete story. No other article in nature can share its identical and fragile beauty.

It is this intricate mechanism of nature which ensures no two ice crystals will ever be alike. The freezing of water however is not an effortless natural process. It must be triggered by contamination in the form of very specific minerals, organic matter and other impurities in the water. The effectiveness of the contaminating materials is determined by the atomic structure of the substance. By completely purifying water, and strictly controlling its environment, water can be held at sub-freezing temperatures, and remain unfrozen in a kind of quasi-suspended animation, indefinitely.

THE INSTALLATION Ice crystals in *Alchymeia* are grown using similar principles that generate snowflakes, but have a microscopic sample of human hormone (inactive steroids assayed from urine) introduced as an atomic building site. Ultra-pure/ultra-cold water is produced by super-

Continued on Page 8

EDITOR'S CORNER

We wanted to give you a heads up about the emerging *IEEE 1394* interconnect standard technology called *Firewire*. *Firewire* will not be available to you for a while, but in a couple years 1394 connectors promise to be as commonplace as the tired old RCA audio-connector.

Our feature article, *Alchymeia* was written by Shawn Brixey who is an incredible artistic technologist working on some mind boggling projects. At first, I was hesitant to use the article. I wasn't sure that it was an appropriate application of interactive/ multimedia work for our newsletter.

In some deeper correspondence with Shawn, he explained it to me this way, "Unlike interactive multimedia works which could be considered a kind of well indexed/didactic presentation (high level simulation), *Alchymeia* is a low level emulation that organically contains far more information and interactivity, because it responds to the most minute changes in its total environment... *Alchymeia*'s interaction just happens at scales which are so far removed from our normal experience they might seem non-interactive to the uninitiated."

We did some layout software switch-o-rama so there may be a few bumps still to be found. I am still waiting for some subscriber contributions and feedback. Please, let me know what you

ORGANIZATIONS

911 MEDIA ARTS CENTER
117 Yale Avenue North
Seattle WA 98109, USA
Tel. +1 206 682 6552
Fax +1 206 682 7422
<911media@911media.org>
<http://www.911media.org>
A non-profit cultural and educational organization that supports the creative uses of media as communication and art-making tools in a democratic society. Their mission is to make media and media literacy an integral part of the community-building process.

CENTRO DE INFORMATICA MUSICAL INFORMUS LIMITADA
Caixa Postal 14498
Rio de Janeiro RJ 22412-970, Brazil
Tel. +55 21 274 8536
<music-center@rionet.com.br>
<http://www.music-center.com.br>
A Brazilian organization dedicated exclusively to music technology. It is an information service specialized in music, MIDI, audio, musical instruments and other subjects regarding music.

THE NEW YORK FOUNDATION FOR THE ARTS
<ing@artswire.org>
<http://www.artswire.com>
A non-profit arts service organization, NYFA is one of the largest providers of grants and services to individual artists and arts-related organizations in all artistic disciplines in the United States.

SOCIETY FOR ELECTRO-ACOUSTIC MUSIC IN THE UNITED STATES
Contact: Brian Belet
San Jose State University
School of Music
One Washington Square
San Jose CA 95192, USA
<http://comp.music.lsu.edu/seamus>
A non-profit organization of composers, performers, and teachers of electro-acoustic music representing every part of the USA and virtually every musical style. **IV**

PRODUCTS

The **SUPER SNOOPER BIG EAR** (US$11) audio surveillance kit allows you to listen through walls, hear conversations across the room and, if you add a parabolic reflector, hear sounds from several hundred yards away. The 1.75"x1" BIG EAR can be used as a 1.5W AMP. Includes a mini-electret mike. Also comes assembled.
Electronic Rainbow Industries, Inc.
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Tel. +1 317 291 7262, fax +1 317 291 7269.
<http://www.rainbowkits.com>

The **PASSIVE INFRA-RED TALKING MOTION DETECTOR** (US$30) plays your recorded message when triggered by motion. Records messages up to 12 seconds in length. The motion sensor uses 4 AA batteries or has a built-in jack for an external power source. It may be used independently (80 db output) or with an amplified speaker to broadcast your recording over a larger area. It's small size (4"x3.5"x1.5") allows it to be easily concealed.
Gateway Electronics, Inc.
8123 Page Boulevard, Saint Louis MO 63130, USA.
Tel. +1 314 427 6116, fax +1 314 427 3147.
<http://www.gatewayelex.com>.

Integrate the **250KV TESLA COIL Kit** (US$300) into your project and display up to 14 inches of fiery electrical plasma discharge. Transmit wireless energy, ion motors and other pyrotechnical effects. The kit includes details on several projects.
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Department NV-7, Box 716, Amherst NH 03031, USA.
Tel. +1 603 673 4730, fax +1 603 672 5406.
<http://amazing1.com>

Electronics Specialists' **POWER CONDITIONER** has been specifically re-designed to extend Uninteruptable Power Supply (UPS) operation into the deep brown-out zone. This is an enhanced regulator/conditioner which provides normal level working voltage even at 90v. The UPS will not switch to its internal battery until the voltage drops below 90v. Different size conditioners can accommodate from 125W to 2500W loads.

Electronic Specialists, Inc.
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Tel. +1 800 225 4876, fax +1 508 653 0268.
<electsp@aol.com>

The **MIDItools 64-OUTPUT HIGH- CURRENT DRIVER** (US$325) allows you to independently control 64 high-current sink outputs from your MIDI note on/off commands. Connect drivers to control any combination of relays, solenoids, electromagnets, or even low-current devices. Add a second expansion board to get 128 drivers (add US$100).

PAVO, Inc.
95 Yesler Way, Seattle WA 98104, USA.
Tel. +1 206 682 7223, fax +1 206 682 7705.
<http://www.pavo.com>
<miditools@aol.com>

The **300W AIRCORE ROLLER INDUCTOR** (US$180) antenna tuner features a wide matching range; matches almost any antenna: dipoles, verticals, inverted vees, random wires, beams, mobile whips, etc. Can be used with coax cables or balanced feedlines. The continuous 6 meter through 160 meter coverage covers all frequencies, including the "magic band."

MFJ Enterprises, Inc.
300 Industrial Park Road, Mississippi MS 39762, USA.
Tel. +1 601 323 5869, fax +1 601 323 6551.
<http://mfjenterprises.com> *IV*

DATES

1ST INTERNATIONAL CAIIA RESEARCH CONFERENCE

Newport, UK: July 5 - 6, 1997
Aces Limited
University of Wales College
Allt-yr-yn Campus, PO Box 180
Newport NP9 5XR, UK
<aces@newport.ac.uk>

New developments in art, technology and consciousness are just a few of the topics to be discussed at this new venue. Includes panels, papers and multimedia presentations from an international group of contributors.

SUMMER NAMM 1997

Nashville, USA: July 11 - 13, 1997
NAMM
5790 Armada Drive
Carlsbad CA 92008, USA
Tel. +1 619 438 8001
Fax +1 760 438 7327

One of the professional music and audio industry's most comprehensive trade shows. NAMM tradeshows are limited to retail music store buyers, music product manufacturers/ distributors and manufacturer representatives of the music products industries.

SIGGRAPH 97

Los Angeles, USA: August 3 - 8, 1997
ACM
1515 Broadway Avenue
New York NY 10036, USA
Tel. +1 212 626.0500
<acmhelp@acm.org>
<http://www.siggraph.org/s97>

A conference and exhibition for artists, engineers, animators, filmmakers, software and hardware developers, scientists, mathematicians alike.

8TH INTERNATIONAL SYMPOSIUM ON ELECTRONIC ART: ISEA97

Chicago, USA: September 22-27, 1997
School of Art Institute of Chicago
<isea97reg@artic.edu>
<http://www.artic.edu/~isea97>

Join some of the international multimedia scene's most creative and celebrated artists at this cutting edge symposium. *IV*

COLLECTIONS

TCI 1997 Industry Resource Guide

TCI
32 West 18 Street
New York NY 10011-4612, USA
Fax +1 212 229 2084

This annual industry resource guidebook offers a plethora of information in the area of entertainment industry technologies.
(US$15 or free with a subscription to TCI).

All Electronics Catalog

PO Box 567
Van Nuys, CA 91408-0567, USA
Tel. +1888 826 5432
Fax +1 818 781 2653
<allcorp@allcorp.com>

Thousands of surplus and new electronic components for research and development, manufacturing and education. Many unique, excess and closeouts from around the world, not available anywhere else.

Artifact Recording

1374 Francisco Street,
Berkeley CA 94702, USA
<info@artifact.com>
<http://www.artifact.com>

A compact disk series of independent experimental music in traditions that continue to thrive in the cracks between the commercial, academic and classical music establishments. A project of Ubu, Inc., an artist-run, non-profit organization supporting experimental and electronic music.

Santa Barbara Science

PO Box 41960
Santa Barbara CA 93140-1960, USA
<science@west.net>

A selection of often hard-to-find and interesting science/technology kits and supplies. This catalog offers something for the whole family to try. **IV**

NEWSLETTERS

On Screen

911 Media Arts Center
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Seattle WA 98109, USA
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<911media@911media.org>
<http://www.911media.org>

More than a newsletter, *On Screen* contains resources for funding, interviews, film, video and multimedia artists with new technology tools, and information about upcoming workshops and screenings.

The Music Connoisseur

The Music Connoisseur
PO Box 476
Peck Slip Station
New York NY 10038, USA
<NY942629@pacevm.dac.pace.edu>
<http://www.arcananet.org>

A new-music publication with reviews of concerts, recordings, interviews with emerging and established figures in the field, editorial opinions and letters from readers, and reports on important business events related to music. **IV**

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<http://www.pavo.com>

We welcome guest articles, opinions, suggestions, pictures, drawings and mail of all kinds. We cannot be responsible for the loss of or damage to any unsolicited materials sent to us.

MAGAZINES

THEATER CRAFTS INTERNATIONAL

TCI
32 West 18 Street, New York NY 10011-4612, USA.
Fax +1 212 229 2084.

A magazine for all aspects of entertainment technology and design. Geared toward both the working professional and the dedicated amateur. TCI focuses on new technologies, projects and products.
(US$25/year for 12 issues).

EXPERIMENTAL MUSICAL INSTRUMENTS

PO Box 784, Nicasio, CA 94946, USA.
Tel. +1 415 662 2182

A quarterly print magazine devoted to unusual musical sound makers. The magazine looks at acoustic and electro-acoustic instruments of all kinds -- the more inventive, the more thought-provoking, the more sonorously distinctive or appealing, the better.
(US$24/year,quarterly, Canada & Mexico US$27, elsewhere US$34).

BOOKS

THE EAR AND LANGUAGE

By Alfred Tomatis
Moulin Publishing Limited
PO Box 560, Norval Ontario L0P1K0, Canada.
Tel. +1 416 778 4769, fax +1 416 778 6491.
<cboyce@ moulpinpub>

In 1963, the author established *The Tomatis Listening Method* for the emerging field of audio-psycho-phonology (A.P.P). A.P.P. is based on the premise that the voice can only emit what the ear can hear, therefore, if you change your ear's ability to listen, you can change how you interact with the world around you.
(US$16, 224 pages, ISBN:0-969-7079-8-3).

THE MUSIC OF THE SPHERES

By Jamie James
Springer-Verlag New York Inc.
175 Fifth Avenue, New York NY 10010, USA.

Philosophies of music and sound have evolved with expanded knowledge of science and the astronomy: The universe as a stately and ordered mechanism calling for divine harmony to shattered notions of chaos and endlessness calling for unlimited possibilities and expansion.
(US$14, 1993, ISBN: 0-387-94474-5)

ONLINE

<http://www.artswire.org>
A huge online communication resource for the arts.

<http://www.futurenet.co.uk>
Future Music Magazine's website.

<http://www.artic.edu/~isea97>
International Symposium on Electronic Arts.

<http://www.ubu.com>
Experimental and electronic music and performance.

<http://art.net/~troika>
A dance theater company devoted to the integration of dance, music, theater, and interactive technology.

HUMANS

Shawn Brixey (Seattle)
Biotechnical Multimedia
<shawnx@u.washington.edu>

Christopher Janney (Lexington)
Public Spaces Installations
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Pamela Z (San Francisco)
Performance Art
<pamelaz@sirius.com>

Brian Wesley Rich (Santa Barbara)
Science
<science@west.net>

Lisa Marie Naugle (Vancouver)
video
<naugle@sfu.ca>

NEW TOYS FOR DIGITAL ARTISTS by Bob Moses

As the multimedia revolution continues to sweep the desktop, there is no doubt that digital artists will have powerful new computer tools to work with in the near future. But how will these computers interface to A/V systems, and will this interface be easy to use and cost effective, or will it be a labyrinth of complicated and expensive cables? Fortunately, these questions have been answered by a new interconnect standard called "IEEE 1394 (or Firewire)".

IEEE 1394 Originally invented by Apple Computer in 1986 (and named "FireWire"), IEEE 1394 (referred to as "1394" from now on) has been adopted by over 60 consumer electronics and computer companies and hailed as the interconnect of choice for multimedia systems. 1394 is not vaporware, it is shipping in volume today on products from Sony, Matsushita, Adaptec, and others. Apple has announced plans to ship Macintosh computers with 1394 on the mother board in 1997, and a number of PC OEMs (such as Compaq and Texas Instruments) have announced plans to provide 1394 support in upcoming models. Microsoft is adding 1394 drivers to Memphis (the next release of Windows). Yamaha is developing a revolutionary digital music and audio system called "mLAN" based on 1394. JVC recently announced the D-VHS format which specifies 1394 as the digital interconnect. miro Computer Products AG has announced a product line of desktop video editing products based on 1394. The list goes on and on.

Connector and Cabling The childproof 1394 connector was originally created for the Nintendo Gameboy, and has proven to be reliable in the most harsh environments. The cable, less than 1/4" in diameter, is very flexible and durable. Two variants of this connector/cable have been standardized. One has 6 conductors - 4 for carrying data, and 2 for power (8 to 40 VDC at up to 1.5 amps). The other has only the 4 data conductors, and is intended for miniature battery-powered devices. The power supplied in the 6-conductor cable enables the physical layer of each node to remain operational even if node's local power is off. In fact, an entire node can be powered off the 1394 bus if its power requirements are modest. Maximum cable length depends on the cable characteristics. The most common 1394 cable contains 28awg wires and can run up to 4.5 meters. 24awg cables can run 14 meters, and several fiber optic technologies have been announced which allow 1394 to run nearly 100 meters.

Topology The topology of a 1394 system may be a daisy chain, tree, star, or a combination of these. The 1394 standard specifies that two devices should not have more than 16 cable hops between them (using normal cables). Up to 63 devices may be connected in one bus, and up to 1023 buses can be interconnected to create a very large network with over 64,000 devices. Each node may have up to 256 terabytes of memory addressable over the 1394 bus. A fair bus access mechanism guarantees all nodes equal access to the bus.

Automatic Configuration During system initialization, each node on a 1394 bus carries out a process of bus initialization, tree identification, and self identification. These functions are carried out automatically with no human intervention (indeed, the human doesn't even notice it). No master controller is required in the system to act as a bottle neck for communications, or a single point of system failure when it is turned off (or crashes). Owing to 1394's support of "hot plugging", new devices may be added to the network simply by plugging them in.

Data Rate The data rates defined for the 1394 cable environment are 304 Mbit/s, 196.608 Mbit/sec, and 393.216 Mbit/s (referred to as "S100", "S200", and "S400"). Devices with different data rates may be freely interconnected and communications will automatically be performed at the highest rate supported by the lower rate devices.

Isochronous Operation 1394 supports two primary means of transferring data; *asynchronous* and *isochronous*. "Isochronous" streams are transmitted with predictable latency, guaranteed bandwidth and on time delivery. Isochronous transmission allows a multitude of audio and video streams to be transmitted through the system. 1394 supports up to 64 independent isochronous "channels", each of which could contain an unlimited number of logical audio or video channels (limited by bandwidth of course). In a multimedia system, one isochronous channel could carry a 5.1 channel surround sound audio signal and an uncompressed digital video signal.

Isochronous operation is divided into time segments that occur every 125 us. Each segment is called an isochronous cycle. The cycle begins when the bus cycle master (any isochronous-capable node, automatically selected during bus initialization) arbitrates for the bus and transmits a special asynchronous packet called a cycle start packet. Within this packet is the value of the cycle master's clock counter. Each device on the bus receives this value and updates their own local clock counter value. This guarantees that all devices on the bus have a common time-base which is essential for removing time-jitter from audio and video streams.

Asynchronous Operation Asynchronous transfers can take place any time the bus is free of isochronous traffic. The protocol guarantees that at least 20% of the bus time is reserved for asynchronous data transfers. A short acknowledge packet is returned to the sender for every asynchronous packet.

Summary IEEE 1394 promises to enable a brave new digital media world. Artists, technologists, and end users will all enjoy the benefits of the simple to use high speed multimedia bus. Tomorrow's digital media devices sporting 1394 interfaces will plug and play with each other, enabling systems unimaginable today. Stay tuned... **M**

CHRISTOPHER JANNEY: CHROMATIC OASIS

The Sacramento Metropolitan Arts Commission has selected artist Christopher Janney in a national competition to create an unique artwork, titled *Chromatic Oasis*, for the new terminal in Sacramento International Airport. Utilizing natural light with MONSANTO's Opti-Color® colored glass, sound and pedestrian interaction, *Chromatic Oasis* will transform a 30 ft. x 30 ft. area under a large skylight into a piece of Janney's ongoing series titled "performance architecture."

Chromatic Oasis will consist of large colored transparent flat glass forms suspended horizontally from the ceiling under a colored skylight. Within these forms will be a series of interactive sound and light components. As passing pedestrians walk underneath the forms, they will be bathed in colored light. At the places where the interactive components are overhead, pedestrians will then be illuminated in a white spotlight and hear a mix of melodic and environmental sounds. Although the sounds will always have some consonant relationship, the sounds will change in pitch and timbre depending on both the time of day and density of activity.

"*Performance architecture* is a term I use to describe a reciprocal relationship between a piece of architecture and the people who use it," said Janney. "As *Chromatic Oasis* will change the visual and aural aspects of the terminal for the nearby pedestrians, so too will the pedestrians change the environment of the terminal and make the building come alive. *Chromatic Oasis* will hopefully create a place of visual and aural rest, an *oasis*, within the airport environment."

Janney recently also won a commission from the Arts and Science Council and Nations Bank of Charlotte, N.C. to create an interactive piece for a new six-story parking structure in Charlotte titled "Touch My Building." He is scheduled to install "Sonic Plaza," a multi-media piece for East Carolina University, including a "media glockenspiel," later this year.

Previous projects by Janney include "Harmonic Runway" in the Miami International Airport and "Reach-New York" in the 34th St. subway, N,R platforms, which were profiled on CBS Sunday Morning in October. He is currently a Research Affiliate at the Center for Advanced Visual Studies, MIT, and Visiting Professor at The Cooper Union School of Architecture, where he teaches his Advanced Concepts course, "Sound As a Visual Medium."

Upcoming projects include "Spectral Tower", a 50-ft. tower of colored light and water mist for a large urban plaza in Hong Kong. **M**

Harmonic Runway, Miami, USA.

ALCHYMEIA (CONTINUED FROM PAGE 1)

cooling water designed for use in bio-technology and semiconductor applications. The water is specially filtered, reducing all contaminating nuclei to zero. Because all impurities in the water have been removed, the human material provides the only structure to build from. When the highly ordered crystal nature of ice uses the tiny human sample to initiate the freezing process, it forces its natural crystal arrangement to elastically deform, identically mimicking the rhythm of the original atomic lattice from the donor sample. Microscopic crystals (ice embryos) nucleated by this process act as molecular seeds, "content memory." which the larger ice crystals in the exhibition clone themselves from.

The ice crystals in the installation are confined by the laws of physics to reflect the unique human presence at all subsequent microscopic and macroscopic scales. The installation crystals produce brilliantly changing colors which are generated by the decreased speed of polarized light in ice specific to the elastic stress in the crystal lattice. Each wavelength of light (color) slows to a different speed, signaling the amount of energy expended by the ice in aligning its atomic structure to match the human provided nuclei.

The supercooling environment used to create the crystals in *Alchymeia* is an upright Scientific Kelvinator frost-free freezer, specially designed by the artist. Argon filled, triple pane, heated glass doors allow the crystals to be viewed via a high intensity, ultra low temperature back light panel. Twelve 9 x 9 x .25 crystal container cells designed for the project use a special plastic created for ultra-low temperature crystal work. Their optical design also insures no distortion of the crystals color. The cells are sterilized with ultrasound and ultraviolet light, filled with ultra-pure water, sealed, and certified after fabrication. Once the water cells are in the freezer, they are held at a precise temperature (-5C) most efficient for the seeding by the human hormone. During both research and exhibition, a control is used leaving one of the cells un-doped (no steroids). It is continuously monitored by video/computer. The un-doped cell does not freeze at the time or temperature schedule of the other cells. It remains un-frozen throughout the exhibition. All doped cells freeze precisely at their target calculated temperature of -5C.

EMULATION VS. SIMULATION This project relies heavily on both the viewers awareness of the humble origin of its basic material (water), as well as the states of transformation the art work continuously passes through. Ultra-purification of the water acts as a kind of eraser, erasing the waters natural memory of transformation, paving the way for a new memory to be mapped into matter.

As art object, it is not made through a traditional reductive or additive process, but instead taught how to build itself, encoded with a type of telematic goal of its own. The viewer understands that "we" become the catalyst for igniting this chain reaction of events, thus dissolving the boundaries between experiment and theater, and between art object and artist.

Ultimately, *Alchymeia* speculates about the future of organic processes of computation and representation in the creation of a new kind of art and communication; one where matter, memory, and message are encoded not by implied simulation, as in a computer, but by emulation, residing in the fabric of real physical space, as in the ice crystals. The crystal — a memory device, an encoded program, and a display all in one-represents a significant strategy for creative expression in this new landscape. **IV**

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Table of Contents