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New Media Art and the Gallery in the Digital Age
are produced and even distributed digitally; these media are beginning to converge with digital forms, such as the Internet, the World Wide Web, and video games, to produce something like a seamless digital mediascape. At work, we are surrounded by technology, whether in offices or in supermarkets and factories, where almost every aspect of planning, design, marketing, production, and distribution is monitored or controlled digitally.

Galleries and museums are far from exempt from the effects of these technological transformations. Indeed, it might be suggested that such institutions are profoundly affected and that the increasing ubiquity of systems of information manipulation and communication presents particular challenges to the art gallery or museum as an institution. At one level, these challenges are practical: how to take advantage of the new means of dissemination and communication these technologies make possible; how to compete as a medium for cultural practice in an increasingly media-saturated world; how to engage with new artistic practices made possible by such technologies, many of which present their own particular challenges in terms of acquisition, curation, and interpretation. Other challenges are arguably far more profound and concern the status of institutions such as art galleries in a world where such technologies radically bring into question not just the way in which art galleries and museums operate, but the very notions of history, heritage, and even time itself upon which they are predicated.

It would be hard to overstate the extent to which the reality of our lives is governed by technologically advanced processes and systems, from ubiquitous and increasingly invisible computer networks to mobile telephony to genetic manipulation, nanotechnology, artificial intelligence, and artificial life, or what Donna Haraway calls the “integrated circuit” of high-tech capital. These technologies, though intimately bound up with such issues as globalization, surveillance, terrorism, and pornography, barely seem to impinge on the spaces of contemporary art—and then only obliquely, or marginally. For example, although Tate Britain in London held a show of net art in 2001 (Art and Money Online, curated by Julian Stallabrass), and Tate Online (“the fifth site,” after the four galleries and the store) has hosted “net.art commissions” since 2002, neither initiative gave the work in question the same status as other contemporary work. Art and Money Online was in Tate Britain’s Art Now space, which exhibits new and experimental work that might not otherwise get a showing in the gallery; net art commissions allow the work to be sequestered safely
away from the actual galleries, while demonstrating Tate’s apparently unimpeachable commitment to such new practices.

It might be argued that, in showing such work in this manner, Tate is reflecting its actual status and importance in the art world. Artists, after all, are not obliged to consider the effects of technology today any more than they were bound to directly consider the effects of industrialization in the nineteenth century. Art reflects the conditions of its time not through the explicit and deliberate use of new techniques or technologies, or through relevant subject matter, but at a deeper level, through transformations in practice that may well be unconscious as far as the artists themselves are concerned. Thus industrialization was represented in nineteenth-century art not in subject matter so much as in the transformations in technique made possible by the industrialized production of paint and in the potential mobility of artists facilitated by new forms of mechanized transportation. Similarly, the effects of information technologies on our culture have found oblique expression, for example, through strategies of systematic and quasi-algorithmic production, such as those of Sol LeWitt or the systems artists of the 1960s and 1970s.

HISTORIES OF DIGITAL ART

Nevertheless, Tate and other such institutions fail to take into account the long history of artists using and directly representing new technologies in their work. It is just that this history has been more or less ignored by most modern and contemporary art galleries. When new media art is represented at all in such institutions, it is almost always treated as a recent phenomenon. But even if one ignores the pioneering work of the Futurists, the Surrealists, Dada, Naum Gabo, Marcel Duchamp, Alexander Calder, and László Moholy-Nagy, explicitly technological art has a history that goes back at least six decades, to World War II, when a number of important technologies developed, including digital computing and radar, giving rise to such discourses as cybernetics, information theory, and general systems theory. Artistic responses to the possibilities that these technologies and ideas offered proliferated after the war. In the 1950s and early 1960s, John Cage developed work that engaged interaction and multimedia and the possibilities of electronics, as in his famous “silent piece,” 4’33”. His work was one of the main inspirations not just for other composers working with electronic means, but also for artists interested in process, interaction, and performance, such as Alan Kaprow and those involved with the Fluxus group.
In the United States, during the 1950s, artists like Ben Laposky and John Whitney Sr., and Max Mathews at Bell Labs made some of the first electronic artworks and experimented with computer-generated music. Meanwhile, in Europe, composers such as Pierre Boulez, Edgar Varèse, and Karlheinz Stockhausen were also experimenting with electronics, while artists such as Jean Tinguely, Pol Bury, Nicolas Schöffer, Takis, Otto Piene, Julio le Parc, Tsai Wen-Ying, and Len Lye (also known as an experimental animator), and groups such as Le Mouvement, The “New Tendency,” ZERO, and the Groupe de Recherche d’Art Visuel (GRAV) started to explore the possibilities of kineticism and cybernetics for art. These explorations were accompanied and encouraged by the work of theorists such as Abraham Moles in France and Max Bense in Germany, both of whom wrote works applying information theory and cybernetics to art. Bense was able to put his ideas into practice at the Stuttgart University Art Gallery, which he founded. During his two decades as head of the gallery, it held some of the very first exhibitions of computer art.

In Britain, a generally pastoral and antitechnological attitude had prevailed in the arts since the nineteenth century, with exceptions such as the Vorticist movement in the early twentieth century. But the primary force for promoting technological and systems ideas in this country was the short-lived but influential Independent Group (IG), a loose collection of young artists, designers, theorists, and architects connected with the Institute of Contemporary Arts (ICA). Through shows and discussions at the Institute of Contemporary Arts and elsewhere, advanced ideas about technology, media, information and communications theories, and cybernetics were presented and debated. The IG was connected with the famous exhibition *This Is Tomorrow* at the Whitechapel Art Gallery in 1956, which explored many of these ideas with great panache. Equally important were the IG’s effects on art education in the United Kingdom, especially through Richard Hamilton and Victor Pasmore’s groundbreaking Basic Design course at King’s College, Durham, part of the University of Newcastle. This greatly influenced artists such as Roy Ascott, who studied and worked with Hamilton and Pasmore and who has continued to develop radical pedagogical strategies for the teaching of art, often involving both new technologies and new, technologically oriented discourses and ideas. The Basic Design course anticipated the wholesale restructuring of art education in the United Kingdom in the early 1960s, which came about as a result of the 1960 report of the National Advisory Council on Art Education (otherwise known as the Coldstream report).
By the mid-1960s, the increasing sophistication and availability of technologies such as video and the ideas of theorists such as Buckminster Fuller and Marshall McLuhan gave further impetus to the development of art practices involving both new technologies themselves and related concepts. Filmmakers Stan Vanderbeek and Len Lye, as well as Fluxus members Wolf Vostell and Nam June Paik, were among the first to use televisions in their work. Paik, whose work also involved other technologies such as tape, was also one of the first artists to take advantage of the development of portable video cameras to produce some of the first video art, a practice taken up by other young artists of the time, including Les Levine and Bruce Nauman. At the same time, other technologies, such as electronics, lasers, and light systems, were exploited by artists including Vladimir Bonacic, Otto Piene, and Dan Flavin. One of the most important developments of the period was that of large-scale multimedia environments. Among those involved in such work were Robert Rauschenberg, Robert Whitman, John Cage, LaMonte and Zazeela Young and their Theater of Eternal Music, Mark Boyle, and groups such as USCO and Pulsa. This type of work intersected with developments in psychedelic rock music and underground entertainment. Many of those later considered conceptual artists worked on such projects.

In this context, it is no surprise that artists began to look at the possibilities of computing for making art. To begin with, the relationship between art and computer technology was mostly conceptual. Artists might be keen to exploit the potential of ideas such as cybernetics for their artistic practice, but few actually used computers. For the first fifteen to twenty years of their existence, digital computers were large, expensive number crunchers, forbiddingly difficult to use and with little to offer to artists as far as the practicalities of making art were concerned. But nuclear defense and other military needs had led to the development of the computer as an interactive visual medium rather than simply a number cruchner. The Strategic Air Ground Environment (SAGE) nuclear early warning defense system, which involved networking, interactivity, and visual interfaces, as well as real-time data processing, led to a new understanding of what a computer might be. This development, along with others such as computer graphics, windows interfaces, mice, and the Arpanet, predecessor of the Internet, produced an increased interest in using such technologies for art. In 1965 and 1966, the first exhibitions of computer art were held at the Stuttgart University Art Gallery and the Howard Wise Art Gallery in New York. The artists and others who first exploited the computer in making art included Lilian Schwartz, Edward
Zajac, Charles Csuri (whose 1967 computer animation *Hummingbird* was the first computer artwork purchased by the Museum of Modern Art in New York), Ken Knowlton, Leon Harmon, and Michael Noll, who pioneered computer graphics in the United States at the same time that Manfred Mohr and others linked to Max Bense did so in Germany.

These first small exhibitions were followed by more ambitious endeavors. Some of the most important work bringing together art and technology, though it did not in general involve computers, was that of Experiments in Art and Technology (E.A.T.), a group founded by Billy Klüver and Robert Rauschenberg to foster collaborations between artists and engineers. In 1966, E.A.T. held its famous show *9 Evenings* at the Armory in New York, staging a series of collaborative happenings involving both artists and engineers. Major exhibitions involving new technologies in the years that followed included *The Machine as Seen at the End of the Mechanical Age* at the Museum of Modern Art, New York, in 1968, which was accompanied by a show of work commissioned by E.A.T., *Some More Beginnings* at the Brooklyn Museum. In 1968 the legendary exhibition *Cybernetic Serendipity*, curated by Jasia Reichardt, was held at the Institute of Contemporary Arts in London. A year later, *Event One* in London was organized by the Computer Arts Society, the British equivalent of E.A.T., while *Art by Telephone* was held at the Museum of Contemporary Art in Chicago. In 1970, critic and theorist Jack Burnham organized *Software: Information Technology: Its Meaning for Art* at the Jewish Museum in New York. Like *Cybernetic Serendipity*, this show mixed the work of scientists, computer theorists, and artists with little regard for any disciplinary demarcations. A year later, the results of Maurice Tuchman's five-year Art and Technology program, which brought together engineers and artists to work on large-scale projects, were shown at the Los Angeles County Museum.

Jack Burnham and Jasia Reichardt also produced critical works on art, science, and technology. Burnham published his magnum opus, *Beyond Modern Sculpture*, in 1968. At around the same time, Reichardt published a special issue of *Studio International* to accompany her exhibition, while Gene Youngblood wrote *Expanded Cinema*, an extraordinarily prescient vision of experimental video and multimedia. Thames and Hudson considered this area important enough to publish two books on art and technology within two years of each other, *Science in Art and Technology Today* by Jonathan Benthall in 1972, and *Art and the Future* by Douglas Davis in 1973, the year when Stewart Kranz pro-
duced his monumental work *Science and Technology in the Arts: A Tour through the Realm of Science/Art*.

It is hard to recapture the utopian energy and belief these exhibitions and publications embodied. As far as Reichardt, Burnham, Davis, and others were concerned, the future of art was as a means of engaging with the concepts, technologies, and systems through which society was increasingly organized. Yet the apogee of this thoroughly utopian project also represented the beginning of its demise, and the replacement of its idealism and techno-futurism with the irony and critique of conceptual art. To begin with, at least, it was hard to distinguish between conceptual art and systems art. Indeed, they were often interchangeable and indistinguishable. But by 1970 the difference was beginning to come clear. That year, which was also the year of Burnham’s *Software* show, Kynaston McShine curated an exhibition at MoMA whose title, *Information*, linked it to work in art and technology. Though it may have suggested a technological orientation and showed some of the same people as *Software*, it did not include the technologists and engineers of that earlier show. Furthermore, the artists evinced an increasingly distanced and critical attitude toward technology.

Thus in the early 1970s art involving new technologies seemed to be superseded by other approaches. Such failure, if it was failure, can be ascribed to the quality of much of the work; the failure of the exhibitions to work as intended; the artists’ refusal to collaborate with industry to realize projects and exhibitions; a suspicion of Systems Art, cybernetics, and computers because of their roots in the military-industrial-academic complex and their use in the Vietnam War; and, finally, difficulties in collecting, conserving, and commodifying such work. The growing disappointment with the counterculture in the early 1970s and the economic crises of the same period did little to encourage technologically based utopianism. Nevertheless, the years from 1965 to the early 1970s were a high point for the exhibition and public visibility of art made using new technologies. Early exhibitions in New York and Stuttgart, and major shows and events such as *9 Evenings, Cybernetic Serendipity*, and *Software* must have made it seem that such work was a future for art, if not the future. Yet by the mid-1970s, such work had more or less disappeared as far as the mainstream art world was concerned.

In the 1970s and 1980s, video art was gradually subsumed by the mainstream art world, but new media, electronic, computer, and cybernetic art was largely ignored. Such art continued to be made and taught,
but it was shown mostly in specialist and trade shows such as SIGGRAPH in the United States, the annual conference organized by the Association for Computing Machinery for those with an interest in graphics. Many of the artists working with technology ended up in the burgeoning computer graphics industry. Douglas Davis, Harold Cohen (Aaron), Woody and Steina Vasulka, Stelarc, Jeffrey Shaw (Legible City), Lillian Schwartz, Paul Brown, and Robert Adrian X still made art using new technologies, but it was largely invisible in the mainstream art world and regarded by some as having failed. Such art did succeed—but not as art. Economic crises led to a restructuring of capitalist economies and global finance that was aided by the increasing ubiquity of networked computing. In what became known as the postindustrial economy, information, rather than material goods, became the focus of production in the West, as predicted by pundits such as Alvin Toffler and Daniel Bell. The techno-utopianism of the 1960s art world reemerged in the 1970s with the personal computer and the Internet, through which technologies developed by the military-industrial-academic complex were repurposed by the neoliberal end of the counterculture, in particular Steward Brand and The Whole Earth Catalog. In the late 1970s, moreover, computer special effects, video games, and user-friendly systems and such cultural responses as cyberpunk fiction, techno music, and deconstructive graphic design all developed.

At the end of the decade, two French academics, Simon Nora and Alain Minc, wrote a report for President Giscard d’Estaing that heralded the “computerization of society” and the advent of “telematics,” meaning the coming together of computers and telecommunications. At about the same time, discourses such as poststructuralism and postmodernism began to emerge, partly as a critical response to the ubiquity and power of information technologies and communications networks. Despite differences in approach and ostensible subject matter, the writings of Jacques Derrida, Jean Baudrillard, Fredric Jameson, Gilles Deleuze and Félix Guattari, and Jean-François Lyotard always imply a critique of systems and communications theories. The space opened up by this critical approach may have begun to make systems art interesting to the mainstream art world again. In 1979 the first Ars Electronica festival, which looked at the application of computers and electronic technologies, was held in Linz, Austria. In 1985 Lyotard curated a massive exhibition at the Centre Pompidou, Les Immatériaux—also discussed in Sarah Cook’s essay in this volume—which was intended to show the cultural effects of new technologies and communication and
information. Also about this time Tate put on its first show of computer-generated art, the 1983 exhibition of work produced by Harold Cohen’s Aaron, an artificial-intelligence program that drives a drawing machine.

But in the late 1980s and early 1990s, technologically based art really began to reemerge. In 1988 Moviola, an agency for commissioning, promoting, presenting, and distributing electronic media art, was founded in Liverpool, and Videopositive, an annual festival of such art, was held under its aegis. (Moviola later transmogrified into the Foundation for Art and Creative Technology [FACT].) In the same year, the first International Symposium on the Electronic Arts (ISEA) was held. A year later, the Zentrum für Kunst und Medientechnologie (ZKM), a major center for media and technology arts, was founded in Karlsruhe, Germany. In 1990 the NTT InterCommunication Center was opened in Tokyo, while the San Francisco Museum of Modern Art held its first show of new media art. Throughout the 1990s, the Walker Art Gallery in Minneapolis showed digital and new media works. About this time the National Gallery in London undertook the first use of computers for the public display of information. In 1993 the Guggenheim in New York held an exhibition titled Virtual Reality: An Emerging Medium, followed three years later by Mediascape. In 1994 the first Lovebytes festival of electronic art was held in Sheffield, and in 1997 the Barbican Art Gallery in London put on the exhibition Serious Games: Art, Technology and Interaction, curated by Beryl Graham (discussed in the case studies section of this book). In Hull, the Time-Based Arts center was established to concentrate on new media arts. In 2001 the San Francisco Museum of Modern Art presented its digital art exhibition 010101, and the Whitney Museum of American Art organized Bitstreams and Data Dynamics. In 2003 FACT opened a new media arts center in Liverpool, while the BALTIC in Gateshead has committed itself to increasing its involvement in new media arts, as has Bromwich’s new arts space, the Public (formerly c/Plex). (However, it is notable that the only institution in London regularly putting on gallery displays of such work is the Science Museum.)

Perhaps the most important event in digital art practice during the 1990s was the first user-friendly Web browser released in 1994. The World Wide Web developed in the late 1980s stemmed from the ideas of Tim Berners-Lee, a British scientist at the European Center for Nuclear Research (CERN) in Switzerland, to use the Internet to allow access to digital documents. To this end he developed a version of the standard generalized markup language (SGML) used in publishing, which he called hypertext markup language, or HTML. It allowed users to make
texts and, later on, pictures available to viewers with appropriate software, and to embed links from one document to another. The emergence of the Web coincided almost exactly with the collapse of the Soviet Union, and the newfound sense of freedom, the possibilities of cross-border exchange, and funding from the European Union and non-governmental organizations (NGOs) such as the Soros Foundation all helped foster net art in Eastern Europe, where much of the early work was done.

When “user-friendly” browsers such as Mosaic and Netscape came out in the early to middle 1990s, a number of artists seized upon the possibilities of the Web as a medium producing work under the banner “net.art.” Such work was made at least partly on and for the Web and could be viewed only online. Vuk Ćosić is said to have coined the term “net.art” in the mid-1990s, to refer to artistic practices involving the World Wide Web, after receiving an e-mail composed of ASCII gibberish, in which the only readable elements were the words “net” and “art” separated by a full stop. Since then the original European “net.art” group—including Vuk Ćosić, Olia Lialina, Alexei Shulgin, Rachel Baker, Heath Bunting, and JODI—as well as artists such as Paul Sermon, 0100101110101101.org, Natalie Bookchin, Lisa Jevbratt, Paul Sermon, Radioqualia, ®™ark (www.rtmark.com), Matt Fuller, Thomson and Craighead, and many others have been extraordinarily productive. At the same time, discussions and commentary about technology and art have proliferated through mailing lists and sites such as Rhizome, Nettime, the Whitney Museum’s artport, and CRUMB (Beryl Graham and Sarah Cook’s digital curating list based at Sunderland University), as well as publications such as Mute. As in the late 1960s and early 1970s, important work has been published in this area by, among others, Lev Manovich, Christiane Paul, Oliver Grau, Stephen Wilson, Edward Shanken, and Michael Rush. Art history departments in Europe and the United States are now starting to look seriously at net art and new media art.

MUSEUMS AND THE ARCHIVE OF THE FUTURE

Despite proliferating artistic practice and projects in digital technologies, such work is underrepresented in museums today. Welcome developments included net art commissions and the increasing interest in film, video, and photography. But most art institutions (unless they are devoted to new media art) fail to encompass or engage this work. The new media works Tate is now collecting and displaying, for example, are
almost entirely static—even if time-based—in that they do not alter in response to interaction or their environment. Work that is interactive and process-based, or that involves networks, systems, and feedback, tends to question the very notions of history, heritage, and time upon which museums and galleries are based. “Real-time” projects in particular have the capacity to process and present data at such a speed that the user feels the machine’s responses as more or less immediate. Real-time computing underpins the contemporary communication and data processing of our techno-culture. Without it, we would have no e-mail, word processing, Internet, or World Wide Web, no computer-aided industrial production, and none of the invisible “smart” systems that surround us. “Real time” also stands for the more general trend toward instantaneity in contemporary culture, involving increasing demand for instant feedback and response, one result of which is that technologies themselves are beginning to evolve ever faster. The increasing complexity and speed of contemporary technology is cause for both euphoria and anxiety.

Both are reflected in the recent work of influential commentators. Richard Beardsworth states that “one of the major concerns of philosophical and cultural analysis in recent years has been the need to reflect upon the reduction of time and space brought about by contemporary processes of technicization, particularly digitalisation.”1 Meanwhile, Andreas Huyssen suggests that an increasing interest in memory constitutes a response to the ever-greater ubiquity of real-time systems: “Our obsession with memory functions as a reaction formation against the accelerating technical processes that are transforming our Lebenswelt (lifeworld) in quite distinct ways. [Memory] represents the attempt to slow down information processing, to resist the dissolution of time in the synchronicity of the archive, to recover a mode of contemplation outside the universe of simulation, and fast-speed information and cable networks, to claim some anchoring space in a world of puzzling and often threatening heterogeneity, non-synchronicity, and information overload.”2

For Huyssen the museum or gallery in current technological conditions might thus be a “place of resistance to” and “contemplation outside” the effects of “accelerating technical processes.” Indeed, museums and galleries traditionally deal with things, objects, whose very materiality would seem to make them resistant to the transformations wrought on other discourses by electronic and digital media. Visits to most galleries and museums today make art seem still very much a matter of producing objects like paintings and sculptures.
But the function of the museum or gallery in relation to “the accelerating technical processes that are transforming our . . . life-world” is more complex. As an archive, a form of artificial, external, memory, it cannot stand outside of, separate and resistant to the technical means that structure our memories. Derrida pursues this theme in his book *Archive Fever*, where he suggests that “we should not close our eyes to the unlimited upheaval under way in archival technology. It should above all remind us that the said archival technology no longer determines, will never have determined, merely the moment of the conservational recording, but rather the very institution of the archivable event . . . this archival technique has commanded that which in the past even instituted and constituted whatever there was as anticipation of the future.”

A gallery such as Tate is both performative and constative. It creates the past it supposedly simply shows by what it chooses to buy, curate, conserve, and display or accept as a donation. Thus it affects not just our understanding of and access to the past, but also our relation to the future by choosing the legacies that are available to us and to future generations. And this is not just a question of taste, fashion, finances, and so on. It is fundamentally bound up with the structure of the gallery as an institution, its understanding of its role, its intentions and duties, and even its physical embodiment. For example, the most cursory look at the history of postwar art in relation to most traditional museums’ holdings demonstrates that—for all the museums’ intentions to represent art of that period—they have failed to engage many forms of practice completely or have done so only partially or belatedly. These forms include cybernetic art, robotic art, kinetic art, telematic art, computer art, and net.art.

It is far from coincidental that such practices emerged either in reaction or response to the increasing importance and ubiquity of information and communications technologies. Museums are not deliberately excluding them. Rather, these institutions, founded in and for conditions of art production and reception of the late nineteenth century, are not properly equipped to show such work, not, at least, as it is presently constituted.

But I do blame particular institutions for a failure of perception and action. For good reason, museums should be wary of the work I have described. The work is difficult to collect, curate, and display. Other forms of art practice, moreover, have equal claim to a museum’s attention; and the historical and contemporary importance of the new art may not yet be obvious. But there are compelling reasons for mainstream
museums and galleries to think actively about engaging with such work, whose long and important history intersects, at crucial points, with other better-known forms of art practice. Indeed, those practices would be very different without new media work. Renewed interest in it will enhance and deepen our understanding of artistic developments in the postwar era. Indeed the art of that period cannot be understood without taking new media art into account.

Furthermore, such practice, in both its historical and its current manifestations, is important for its capacity to reflect our current technological condition. This is one reason why so many artists work in the field of new media. It is also why any move to collect and display work made in this area is likely to prove very popular, especially among younger people. For many of them a world without video games, computer special effects, the Internet, the World Wide Web, mobile phones, and so on, is almost unimaginable. These are also the technologies that underpin and make possible globalization, genetic manipulation, bioterrorism, and other such phenomena. Art made by using and reflecting upon new media and new technologies helps us understand how our lives are being transformed by these very media and technologies. The gallery has an important role to play in making this art visible, not just now but also in the future, when such work will be part of art history. How our culture archives our past is not a question of our relationship just with that past, but with the future as well. What we choose to archive and thus to preserve for future generations will help determine the future.

NOTES
This essay reflects on some of the issues arising out of the three months I spent at Tate on an Arts and Humanities Research Board “Changing Places” Fellowship in 2002, looking at the role of the gallery in the digital age. A different version appears on the Tate Papers part of the Tate Web site, http://www.tate.org.uk/research/tateresearch/tatepapers/04autumn/gere.htm.