Michael Naimark

Title: Digital Stereoscope
Genre: New Media
Applicant's Role in Production: Artist
Production Format: Custom System

Brief Project Description (do not exceed space given below)

“Digital Stereoscope” explores how new media can be used to expand and broaden our sense of place, particularly for real (rather than fantasy) places. It specifically focuses on means of “immersive place representation” such as stereoscopy and interactive panoramics. Recording and exhibiting such immersive imagery is a “chicken-and-egg” problem requiring a commitment to work at both ends.

New media technologies offer unprecedented new ways to make such immersive experiences, particularly in the realms of “hyper-media” and “liveness.” Exploring the aesthetics of such immersive experiences is equally unprecedented.

The bottleneck for such immersive imagery is currently the display. This project explores the technical and aesthetic possibilities of an inexpensive personal immersive viewer inspired by the Nineteenth Century Stereoscope, more in the spirit of folk art than either commercial or fine art.
Michael Naimark

Title: “3 Projects”
Year: 1993 - 2002

Technical

Original Format
___ Software
___ Web
X Installation(s)
___ Other

Format Submitted for Viewing
___ Software
___ Web
___ VHS
X Other

Preferred OS
___ Windows
___ Mac
___ Unix
___ Other

Special Information For Viewing: (none: all on a single chapter. just hit play)

Description of Work (use an additional sheet if necessary)

These three projects are shown together in the context of a single, integrated exploration of immersive place representation and ways to simulate both live and hyper-real imagery.

TRT 9:00

1. See Banff! (Banff Centre for the Arts & Interval Research, 1993-1994) (TRT 1:15, Silent)
   --- Single-person 3D Immersive Viewer

   --- Multiple-person 3D Immersive Installation (this could be live)

   --- Hyper-media Imagery from the Be Now Here footage (making “more” “happen”)
   --- --- 1. from two registered images (silent)
   --- --- 2. from three registered movies (very short, repeated 3 times)
   --- --- 3. panoramic composites
   --- --- --- a. same footage repeated
   --- --- --- b. different times of day
   --- --- --- c. same time | different places
Artist Statement

Michael Naimark

September 2004

I've been a professional "media artist" (at least in the eyes of the IRS) since 1980. My particular area of experience may be called "immersive place representation," exploring how new media technologies can be used to expand and broaden our sense of place, particularly real (rather than fantasy) places.

The closest guiding principles of my practice may be Gregory Bateson’s assertion that almost all meaningful human interaction happens on a non-verbal level; Gyorgy Kepes’ philosophy that an interdisciplinary approach to the arts builds bridges between people, their environments, and themselves; and Stewart Brand’s statement about art as “at guerrilla war with artifice, employing and subverting the artificial to reawaken the real.” (I’ve had the fortune of having had several conversations with Bateson, Kepes as a longtime mentor, and Brand as an ongoing colleague and collaborator.)

In this light, a major external metric for success in my work is whether it attracts members of the arts community, the technology community, and (for lack of a better word) the activist, ideally in equal doses. The closest I’ve come is with my installation “Be Now Here,” which attracted arts people because of its venues (San Francisco Center for the Arts, the Anchorage, Kiasma), tech people because of its unique stereo-panoramic immersion, and people interested in the Middle East, the Balkans, West Africa, and Southeast Asia because of its content.

A high personal priority is to understand the distinction between “first word art,” where newness, novelty, and innovation are its prominent features, and “last word art,” where
“doing well,” “doing best,” and “virtuosity” are most prominent. This is a high personal priority because history has demonstrated that, on occasion, it’s possible to do both. (1)

A related personal priority is to understand the dynamics of getting innovative work successfully realized. Traditionally, the old media world (e.g., film) requires a much higher commitment to staying on-plan while the new media world encourages experimentation where it’s OK to fail. I’m convinced that a “calculated risk” can be nurtured which balances creative exploration with getting things done. (2)

Over a twenty-year period (~1977-97), my “place representation” work slowly evolved from formal art and technology concerns to acknowledge the politics of place and the politics of representation. My work became as much about cultural geography, indigenousness, and the future of travel and tourism as it was about field cinematography, interactive installations, and immersive display. (3)

My current interest in immersive place representation is around the implications of “going live” via the Internet rather than using pre-recorded media (as all of my past work did). Cheap digital cameras, better video compression, and broader Internet “pipes” afford unprecedented opportunities to explore and express what might happen when immersive sensory richness and liveness converge. (4)

The bottleneck for such live immersion is now the display. On a practical level, one approach that needs to be explored is a simple immersive personal viewer, like a digital version of the Nineteenth Century Stereoscope.
DESCRIPTION --- Imagine going to an unfamiliar place and spending the entire day there. Not just a few minutes like a tourist. And not to a familiar place you already know well. You may sit in one place or you may walk around a bit. But you’re there, from dawn to dusk. Your goal is not to watch any narrative unfold as much as to simply experience the ambience of being there. At the end of the day, chances are good that you will have a modest but unique sense of knowing this place, since we so rarely commit to such experiences. Perhaps it’s a bit like the difference between photographing and painting a landscape.

It turns out, re-presenting these circumstances are becoming technically feasible through various new media. We understand little about the aesthetics of immersion. It has mostly been constrained to Imax theaters and theme parks, or to the computer-generated cartoon worlds of “virtual reality.” Exploring such new forms of immersive media are both aesthetic challenges and opportunities.

One aesthetic opportunity is the exploration of hyper-real imagery. From the same viewpoint, events occurring over time can “accumulate” in the same frame. The result is a single image where “more” can “happen.” (Think Bruegel.) This is particularly possible if the camera is fixed on a tripod, then the imagery can be segmented and re-composited. Hyper-real imagery can also work in reverse, where events are subtracted and “less happens.”
Another aesthetic opportunity is that the imagery could be live, for example from a fixed Internet “VR web cam.” Liveness has strong cognitive and emotional resonance. Live full-scale immersion is entirely unprecedented. Imagine a live immersive feed from an anthill, or a rainforest, or from downtown Baghdad.

My work over the past twenty-some years has reflected upon what such immersive place representation means and has explored ways of realizing modest experiments. One lesson learned is that a chicken-and-egg problem exists between recording and exhibiting immersive imagery. I’ve had to design camera contraptions and build large-scale immersive installation spaces. One project, Be Now Here, required a 500-pound rotating 3D camera system and a 3,000-pound installation consisting of a stereoscopic screen (for 3D) and a rotating floor. A commitment to understanding immersion becomes all or nothing.

I will continue work on immersive place representation with particular emphasis on hyper-real and live imagery. I will also continue to explore ambience rather than narrative. (This is a particularly weird challenge in my current position as faculty in the USC Film School, where “story” reigns and few are familiar or interested in non-narrative cinema such as Maya Deren, Stan Brackage, or Godfrey Reggio.)

I specifically plan to pursue personal immersive viewers as a partial solution to the chicken-egg problem and as a new aesthetic challenge. The Nineteenth Century StereoScope had several relevant qualities. It was an instrument for immersive viewing, mainly of real places. People took time looking at each image. It was technologically transparent and non-fetishistic, yet a well-crafted object. It was neither fine art (like paintings then or installations today) nor monopolistically
FEASIBILITY --- A "Digital Stereoscope" would be like an original stereoscope but would be dynamic and interactive. Video displays instead of photographs enable moving imagery. Intuitive (and possibly invisible) navigational control could enable panoramic "look-around." Appropriate video displays and navigational sensors can be relatively inexpensive. The challenge is having realistic expectations for technical quality while paying attention to detail and aesthetics. This project balances both.

USE OF WORK --- It’s neither intended to be commercial nor fine art. On some level, it’s sort of an “anti-installation” solution. The intention is to have something showable, albeit one person at a time, at various art, tech, art+tech, and (ideally) content-oriented venues.

BUDGET NARRATIVE --- I plan to spend the money equally for art ($10,000), and for technology ($10,000), as well as for living and overhead expenses ($15,000). The art expenses include travel and post-production assistance. The tech expenses include cameras, displays, sensors, computer, and modest custom fabrication. The living expenses is to supplement my current faculty salary (which is roughly half-time) for six months.
## Project Budget

Michael Naimark  
September 2004

<table>
<thead>
<tr>
<th>Category</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Art</strong></td>
<td>$10,000</td>
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<tr>
<td>research and travel</td>
<td>$4,000</td>
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<tr>
<td>post-production and assistance</td>
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<tr>
<td><strong>Technology</strong></td>
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<tr>
<td>cameras (2)</td>
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<tr>
<td>displays</td>
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<tr>
<td>sensors</td>
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<td>custom work</td>
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<tr>
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<td>$5,000</td>
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<tr>
<td><strong>Living &amp; Overhead</strong></td>
<td>$15,000</td>
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<tr>
<td>6 months halftime</td>
<td>$15,000</td>
</tr>
</tbody>
</table>

**TOTAL BUDGET**  
$35,000
CURRICULUM VITA

Michael Naimark

www.naimark.net

Interests

Art and science: presence and abstraction, new media and interactivity, psychophysics and cognition.
Place representation: field cinematography, image-based modeling, immersive virtual environments.
Consequences: virtual travel and tourism, cultural geography, globalization.
Technology-based art and the dynamics of sustainability.

Born

16 November 1952, Detroit, MI
US Citizen

School

M.S., Visual Studies and Environmental Art, Massachusetts Institute of Technology, 1979
B.S., with high distinction and high honors, Cybernetic Systems (independent major), University of Michigan, 1974

Work

2001-present: Media Artist and Researcher (self-employed). Clients include:

2004: Ars Electronica Festival, Linz, AUSTRIA
2004: Columbia University School of the Arts
2002-03: Leonardo/ISAST and the Rockefeller Foundation, New York
2001-02: Institute of Advanced Media Arts and Science, Gifu, JAPAN

1992-2001: Member of the Research Staff, Interval Research Corporation, Palo Alto


1980-1992: Media Artist and Researcher (self-employed). Major clients include:

1987-90: Apple Multimedia Lab and Human Interface Group
1986-90: Lucasfilm Ltd., Nicosia, CA
1985-86: Panavision, Tarzana, CA
1982-84: Atari Research Lab, Sunnyvale, CA


Faculty Appointments and Residencies

2004-5: Visiting Associate Professor, Interactive Media Division, School of Cinema/Television, USC
2004: Adjunct Faculty, Interactive Media Division, School of Cinema/Television, University of Southern California
2004: Adjunct Faculty, Interactive Telecommunications Program, Tisch School of the Arts, New York University
Awards, Grants, and Acknowledgements

2002: Recipient, Rockefeller Foundation Creativity & Culture grant, New York (Leonardo/ISAST arts lab study)
2002: Recipient, World Technology Award for the Arts, New York
2001: Nominee, World Technology Award for the Arts, London, UK
1998: Nominee, ICC Biennale '99, Tokyo, JAPAN (abstained)
1995: Finalist, Interactive Media Festival, Los Angeles
1995: Nominee, Chrysler Innovation in Design Award, New York
1994: Nominee, ARTEC '95, Nagoya, JAPAN
1992: Recipient, First Award (SFAI Immersive Virtual Environments class), Futures Scenario, ACM SigCHI, Monterey
1992: Artist, Fellowship Program Grant in "New Genres," California Arts Council
1991: Recipient, Artist Grant, Tamarack Foundation, San Rafael, CA
1989: Recipient, Spring Show Award (Virtual Environments class), SF Art Institute
1984: Recipient, First Award, SECA "Film as Art," SF MOMA
1983: Finalist, Society for the Encouragement of Contemporary Art (SECA) Award, SF MOMA
1980: Recipient, Media Arts Fellowship, National Endowment for the Arts
1979: Finalist, Video Artists Fellowship, The Artists Foundation, Boston
1979: Recipient, M.I.T. Council for the Arts Grant
1978: Recipient, M.I.T. Council for the Arts Grant

Professional Activities

2004-present: Member, MIT Corporation Visiting Committee, Media Laboratory and Media Arts & Sciences
2002-present: Board of Advisors, National Art and Technology Network (NATN), The Kitchen, New York
2002-present: Board of Advisors, International Society of Arts, Science & Technology (ISAST), San Francisco
2001-present: Program Committee, Virtual Systems and Multimedia (VSMM) Conference, Berkeley
2001-present: Board of Advisors, Media Lab Europe, Dublin, IRELAND
2001-present: Board of Advisors, The Lab artists organization, San Francisco
2000-present: Board of Advisors, Creative Disturbance, San Francisco/Marseilles, FRANCE
2000-present: Board of Directors, ZeroOne Foundation, Palo Alto
1998-present: Board of Directors, Coalition of Artists and Life Forms, San Francisco
1991-present: Editorial Board, PRESENCE, MIT Press
1994-present: Member, Society for Visual Anthropology, American Anthropological Association, Washington, DC
2004: Guest Curator, Ars Electronica Festival Symposium, Linz, AUSTRIA
2004: Collaborator, Siggraph '04 Computer Animation Pre-Show (Squid Ball)
2003: Demonstrations Program Committee, Ubicomp 2003, Seattle (self-withdrawn under protest)
2003: Thesis Reviewer, Comparative Media Studies, MIT
2001: Papers Reviewer, Siggraph 2001, Los Angeles
2000: Advisor, Jewish Museum planning meeting, San Francisco
1999: Graduates Reviewer, SF Art Institute, New Genres
1998-2001: Board of Directors, The Lab artists organization, San Francisco
1998: Jury Chair, Interactive Art, Ars Electronica, Linz, AUSTRIA
1997: Thesis Reviewer, MIT Media Lab
1997: Juror, Interactive Art, Ars Electronica, Linz, AUSTRIA
1996: Papers Reviewer, Symposium for User Interface Software and Technology (UIST), Seattle
1995: Juror, Interactive Art, Ars Electronica, Linz, AUSTRIA
1995: Juror, "10/10 Portraits in Cyberspace," Artshow, MIT Media Lab
1994: Thesis Reviewer, School of Architecture, UC San Diego
1994: Juror, Interactive Art, Ars Electronica, Linz, AUSTRIA
1994: Juror, "NewMediaTopia" Exhibition, Moscow, RUSSIA
1993: Program Committee, First Virtual Reality Annual International Symposium (VRAIS), IEEE, Seattle

Michael Naimark
1993: Nominator, Interactive Media Festival, Los Angeles
1993: Juror, Siggraph Multimedia Exhibition, Los Angeles
1991: Thesis Reviewer, SF Art Institute, New Genres
1990: Steering Committee, Cyberthon Conference, Point Foundation, Sausalito
1989: Graduates Reviewer, Architecture Dept, Cai College of Arts and Crafts, San Francisco
1988: Nominator, SECA Video Art Award, SF MOMA
1988: Juror, San Francisco International Film Festival
1987: Juror, San Francisco International Film Festival
1987: Juror, Athens International Video Festival, Athens, OH
1986: Juror, San Francisco International Film Festival
1986: Juror, Ann Arbor Film Festival
1985-90: Co-Host, Interactive Video Conference, Whole Earth "Lectronic Link (The WELL), Sausalito
1985: Juror, "Cindy" videodisc award, Assoc of Visual Communicators, San Francisco
1984: Contributing Editor, Video and the Arts (formerly Video Eighties), San Francisco
1984: Board of Advisors, Twin Palms Gallery, San Francisco

Publications


Naimark, M. (2002). Interaction 01. Review. Diabxt, the critical journal by the Kyoto Art Center, vol. 6, Kyoto, JAPAN.
Naimark, M. (1997). What’s Wrong with this Picture: Presence and Abstraction in the Age of Cyberspace. Consciousness Reframed Proceedings, CAIA, University of Wales, Newport, WALES.
Naimark, M. (1996). (untitled talk), NewMediaLogia Symposium Proceedings, Soros Center for Contemporary Art, Moscow, RUSSIA.


**Video**


**U.S. Patents Granted**


**Exhibitions**

**Permanent Exhibitions**

2000-present: American Museum of the Moving Image, Queens, NY (See Banff Kinetoscope)

1997-present: Zentrum fur Kunst und Medientechnologie (ZKM), Karlsruhe, GERMANY (Karlsruhe Moviemap)

1987-present: Exploratorium, San Francisco (Golden Gate Flyover)

**Solo Exhibitions**

2001: Presidio, SF International Film Festival and SF MOMA (Be Now Here)

1995-6: Yerba Buena Center for the Arts, San Francisco (Be Now Here)

1995: Berkeley Art Museum / Pacific Film Archive (See Banff Kinetoscope)

1985-86: Madeleine Metro Station, Paris FRANCE (Paris VideoPlan)
1984: Bruce Velick Gallery, San Francisco (Virtual Object Series)
1984: San Francisco Museum of Modern Art (Displacements)
1980: Center for Advanced Visual Studies (CAVS), MIT (Movie Room)
1978: Dept of Architecture, MIT (Moving Movie Studies and Dome Projections)

Group Exhibitions

2004: Interactions/Art and Technology, American Museum of the Moving Image, New York (See Banff)
2003: Future Cinema, Kiasma Museum of Contemporary Art, Helsinki, FINLAND (Be Now Here)
2002-3: Future Cinema, Zentrum fur Kunst und Medientechnologie (ZKM), Karlsruhe, GERMANY (Be Now Here)
2002: Navigate @ Art, Automobil Forum Unter den Linden, Berlin, GERMANY (Karlsruhe Moviemap)
2001: ArtSale 2001, The Lab, San Francisco (sortitout.org)
1998: Exploding Cinema, International Film Festival, Rotterdam, NL (Be Now Here)
1997: Art in the Anchorage, Creative Time, New York (Be Now Here)
1997: Dallas Video Festival, Dallas Museum of Art (See Banff)
1997: Best of Dallas Video Festival, LA Film Forum, Los Angeles (compilation video)
1997: Finding the Fulcrum (Leonardo's 30th Anniversary Show), 111 Minna Gallery, San Francisco (Eyepiece)"  
1996: Digital Bayou, Siggraph '96, New Orleans (Be Now Here)
1995: Interaction '95, International Academy of Media Arts and Sciences (IAMAS), Gifu, JAPAN (Karlsruhe Moviemap)
1995: Old Glory, Santa Monica Museum of Art (No State)
1994: G-Tech Exhibit, Siggraph '92, Chicago (Field Recording Studies)
1994: Old Glory, Santa Monica Museum of Art (No State)
1994: International Symposium on Electronic Art (ISEA) 94, Museum of Contemporary Art, Helsinki, FINLAND (See Banff)
1994: Walter Phillips Gallery, Banff Centre for the Arts, CANADA (See Banff)
1994: Film Academy (w/ISEA), St. Petersberg, RUSSIA (Virtuality, Inc.)
1993: Multimediale 3, Zentrum fur Kunst und Medientechnologie (ZKM), Karlsruhe, GERMANY (EVE project)
1992: G-Tech Exhibit, Siggraph '92, Chicago (Field Recording Studies)
1992: Images du Futur '92, Montreal, CANADA (Karlsruhe Moviemap)
1992: Triennale di Milano, ITALY (EAT and Karlsruhe Moviemap)
1992: Futures Scenarios, ACM SigCHI Conference, Monterey (Virtuality, Inc.)
1991: Multimediale 2, Zentrum fur Kunst und Medientechnologie (ZKM), Karlsruhe, GERMANY (Karlsruhe Moviemap)
1991: Art and Multimedia, Center for Advanced Visual Studies (CAVS), MIT (compilation video)
1991: Digital Bayou, Siggraph '96, New Orleans (Be Now Here)
1990: Cyberthon Conference, Point Foundation, San Francisco (EAT, Golden Gate Flyover, and Virtual Object Series)
1990: Virtual Reality Panel, Siggraph '90, Dallas (Virtuality Inc.)
1989: Mill Valley Film Festival (EAT)
1989: San Francisco Art Institute (EAT)
1989: Kanagawa International Art and Science Exhibition, JAPAN (Golden Gate Flyover)
1988: Exploratorium at the Kennedy Center for the Performing Arts, Washington, DC (Golden Gate Flyover)
1988: Exploratorium at the World Financial Center, New York (Golden Gate Flyover)
1987: The Situated Image, Mandeville Art Gallery, UC San Diego (Computer Eyepiece)
1986: San Francisco International Video Festival (Computer Eyepiece)
1986: VAPE, Center for Advanced Visual Studies (CAVS), MIT (EAT and Karlsruhe Moviemap)
1986: Siggraph '83 Artshop, Detroit (Computer Eyepiece)
1985: Siggraph '85, Siggraph Videodisc
1985: Siggraph '85, Expo '85, Tsukuba, JAPAN (Siggraph Videodisc)
1984: Ann Arbor Film Festival (Computer Eyepiece)
1984: The Artist As A Young Machine, Ontario Science Center, Toronto, CANADA (Computer Eyepiece)
1984: San Francisco International Video Festival (Computer Eyepiece)
1983: Siggraph '83 Artshop, Detroit (Computer Eyepiece)
1982: A Young Machine, Ontario Science Center, Toronto, CANADA (Computer Eyepiece)
1981: Siggraph '81, Expo '81, Siggraph Videodisc
1981: SF Art Institute Film Festival (Eyepiece and Moving Movie)
1980: SIGGRAPH '80, Los Angeles (Computer Eyepiece)
1980: Exploratorium at the World Financial Center, New York (Golden Gate Flyover)
1979: Cyberthon Conference, Point Foundation, San Francisco (EAT, Golden Gate Flyover, and Virtual Object Series)
1978: The Mall, Washington, DC (CenterBeam)
1977: Documenta 6, Kassel, GERMANY (CenterBeam)

Invited Presentations

199 (09/04): Ars Electronica, Linz, AUSTRIA
194 (08/04): Siggraph '04, Los Angeles
193 (07/04): First International Conference on Design Computing and Cognition (DCC '04) Workshop, MIT
192 (05/04): Digital Avant-Garde, Celebrating 25 Years of Ars Electronica (moderator), Austrian Cultural Forum, New York
190 (01/04): Interactive Media Division, USC School of Cinema-Television Visiting Speaker Series
120 (02/96): Governor's Conference on the Arts, Los Angeles
119 (01/96): Urban Site Panel, Yerba Buena Center for the Arts, San Francisco

118 (11/95): Geography Dept, UC Berkeley
117 (10/95): Seminar on Cinema Research, Directors Guild/American Museum of the Moving Image, Queens, NY
116 (08/95): Museums of the Future Panel, Siggraph 95, Los Angeles
115 (05/95): Oksnoen 95 Symposium on "Presence," Oksnoen, NORWAY

114 (11/94): NewMediaLogia Symposium, Moscow, RUSSIA
113 (10/94): Artists in Multimedia Panel, ACM Multimedia Symposium, San Francisco
112 (08/94): Film Academy (in conjunction with ISEA '94), St. Petersburg, RUSSIA
111 (06/94): Virtual Café (via picturephone), McLuhan Program, U Toronto, CANADA
110 (05/94): Museum of the Future Symposium, University of Ferraara/UC Berkeley, Bologna, ITALY
109 (04/94): Center for Digital Multimedia, NYU
108 (03/94): Espace Electra, U Paris 1+8 Joint Series, Paris, FRANCE

106 (11/93): Explorations in New Realities, Dallas Video Festival, Dallas Museum of Art
105 (05/93): Cyberspace 3 Conference, Austin
104 (05/93): Beaux-Arts, Paris, FRANCE
103 (03/93): Dept of Architecture, UC Berkeley
102 (03/93): Art Talk, Xerox PARC, Palo Alto
101 (02/93): Interface II Conference, Hamburg, GERMANY
100 (02/93): College of Arts and Sciences, USF

99 (11/92): Human Computer Interaction Seminar, Stanford University
98 (11/92): Navigation Series, Exploratorium, San Francisco
97 (10/92): Cyberspace Conference, Pasadena
96 (09/92): Center for Creative Imaging, Camden, ME
95 (06/92): Virtual Travel Panel, Travel and Tourism Research Association (TTRA) Annual Conference, Minneapolis
94 (06/92): VR and Art Panel, YLEM, Exploratorium, San Francisco
93 (05/92): Design for Conversations Seminar for duPont, Pangaro Inc., Boston
92 (01/92): Artistic Experimentation with Multimedia Panel, MacWorld EXPO, San Francisco

91 (11/91): Bioapparatus Residency, Banff Centre, CANADA
90 (10/91): Bits of Art series, School of Art, University of Cincinnati
89 (10/91): Pioneer LDC, Tokyo, JAPAN
88 (10/91): Art and Multimedia panel, International Conference on Multimedia '91, Tokyo, JAPAN
87 (10/91): Savannah College of Art and Design
86 (10/91): Center for Electronic Art, San Francisco
85 (08/91): First Moscow International Workshop on Human-Computer Interaction, Moscow, USSR
84 (08/91): Virtual Reality Summer Seminar, SF Art Institute
83 (06/91): Center for Electronic Art, San Francisco
82 (05/91): Multimediale 2, ZKM, Karlsruhe, GERMANY
81 (04/91): Cyberspace II Conference, Santa Cruz
80 (03/91): ITVA panel, San Francisco
79 (03/91): IBM (DPS Project), Los Angeles
78 (02/91): Center for Electronic Art, San Francisco

77 (12/90): Interactive Multimedia Association Developer's Forum, Scottsdale, AR
76 (10/90): Cyberthon Conference, San Francisco
75 (10/90): Center for Electronic Art, San Francisco
74 (08/90): Interface Panel, Siggraph '90, Dallas
73 (08/90): Center for Electronic Art, San Francisco
72 (07/90): Multimedia '90 Conference, Hakone, JAPAN
71 (07/90): Center for Electronic Art, San Francisco
70 (04/90): Gender and Cultural Bias Panel, Computer Games Developer's Conference, San Jose
69 (03/90): Whittle Communications, Knoxville
68 (03/90): Pacific Film Archive, UC Berkeley
67 (02/90): Conceptual Design Dept, SFSU

66 (12/89): Whittle Communications, Chicago
65 (12/89): St Louis Zoo
64 (11/89): US International Cultural and Trade Center Commission, Washington DC
63 (11/89): Lucasfilm/Apple Umbrella (LUAU) talk, Headlands Center for the Arts, Marin Headlands, CA
62 (11/89): Art Dept, SFSU
61 (10/89): Autodesk Corporation, Sausalito
60 (10/89): Society of Motion Picture and Television Engineers (SMPTE) Conference, Los Angeles
58 (09/89): Film Dept, SF Art Institute
57 (02/89): American Society of Magazine Photographers, San Francisco
56 (02/89): Developing Interactive Video Workshop, Aspen Institute, Wye Woods, MD

55 (11/88): Apple Developer's Conference, Cupertino
53 (08/88): Museum of Science and Industry, Chicago
52 (08/88): Multi Image Association, Phoenix
51 (07/88): Open School, Apple Vivarium Project, Los Angeles
50 (06/88): Fluid Media Conference, Apple Computer, Cupertino
49 (05/88): Beyond CAD Symposium, American Institute of Architects, San Francisco
48 (02/88): Multimedia Authoring Panel, Microsoft Third International CD-ROM conference, Seattle

47 (12/87): Lotus Development Corporation, Cambridge
46 (10/87): Mattel Inc., Hawthorne, CA
45 (09/87): Interactive Video for Museums Workshop, Boston Museum of Science
44 (07/87): Society of Motion Picture and Television Engineers (SMPTE), San Francisco Chapter
43 (06/87): High Technology Media Panel, American Association of Museums Annual Conference, San Francisco
42 (06/87): Emerging Media Landscape Conference, Diaquest Corporation, Berkeley
41 (05/87): HOK Associates, St Louis
40 (03/87): Athens International Video Festival, Athens, OH

39 (10/86): Microsoft Corporation
38 (10/86): Advanced Decision Systems, Santa Clara
37 (07/86): Summer Arts '86 Conference, Cal State University, San Luis Obispo
36 (06/86): School of Medicine, Stanford University
35 (05/86): Panavision, Tarzana, CA
34 (03/86): Film/Video Program, Univ of Michigan

33 (12/85): Film/Video Dept, Cal Arts
32 (12/85): Interactive Videodisc Consortium, San Francisco
31 (11/85): California Academy of Science, San Francisco
30 (10/85): MIT Media Lab
29 (04/85): Dept of Geography, UC Berkeley
28 (03/85): International Interactive Communications Society (IICS), San Francisco Chapter
27 (02/85): Centre Mondial, Paris, FRANCE
26 (02/85): Ecole National Superior des Art Decoratif, Paris, FRANCE
25 (02/85): Mirror Systems, Cambridge

24 (11/84): First Annual Hacker's Conference, Marin Headlands, CA
23 (06/84): 4th grade class, South Elementary School, Hingham, MA
22 (04/84): Renan Productions, Los Angeles
21 (03/84): Dept of Education, University of Michigan
20 (02/84): Friends of the Earth, San Francisco
19 (01/84): SPIE Conference, Los Angeles
18 (01/84): Videodisc Workshop, Bay Area Video Coalition (BAVC), San Francisco

17 (01/83): Warner Brothers Records, Los Angeles

16 (12/82): Bank of America, San Francisco
14 (06/82): International Television Association (ITVA), Houston chapter
13 (04/82): AEC Seminar, Engineering News-Record, Denver
12 (04/82): AEC Seminar, Engineering News-Record, Houston
11 (03/82): Landor Associates, San Francisco
10 (03/82): Math Imagery Conference, UC Santa Cruz
9 (02/82): New Directions/New Dimensions Showcase, Diaquest Corporation, Berkeley

8 (12/81): Office of the President, National Geographic Society, Washington DC
7 (10/81): Graphics Gathering, Stanford University
6 (09/81): Video Department, California College of Arts and Crafts, Oakland
5 (08/81): Still-Frame and Optical Transfer, Summer Session on Interactive Videodiscs, MIT
4 (08/81): Videodisc Cinematography, Summer Session on Interactive Videodiscs, MIT
3 (05/81): WED Enterprises (Disney Research), Glendale, CA

2 (03/80): Center for Advanced Visual Studies, MIT
1 (01/80): Art and Perception Conference, Dept of Psychology, MIT