

New Media Fellowships
2005 Project Cover Form

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

If you are sending more than one sample, please copy this page. Sample(s) must be cued: indicate how long each sample should be viewed for a COMBINED viewing time of no more than 15 minutes. If slides are included in this application, please list the title and year of the work on this form.

Title **"3 Projects"**

Year **1993 - 2002**

Technical

Original Format

☐ Software
☐ Web
☒ Installation(s)
☐ Other _____

Format Submitted for Viewing

☐ Software
☐ Web
☐ VHS
☒ Other DVD

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

2. **Be Now Here** (Interval Research & UNESCO World Heritage Centre, 1995-1997) (TRT 2:30)
--- Multiple-person 3D Immersive Installation (this could be live)

3. **VR Webcam Studies** (IAMAS, Gifu, Japan, 2001-2002) (TRT 5:15)
--- 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 word (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, indigenouness, 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.

Digital Stereoscope

Michael Naimark

September 2004

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

commercial (like the ViewMaster a half-century later), but more of a folk art. It may serve as an ideal model for a digital version.

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

Art		\$10,000
research and travel	\$4,000	
post-production and assistance	\$6,000	
Technology		\$10,000
cameras (2)	\$1,800	
displays	\$1,000	
sensors	\$200	
custom work	\$2,000	
computer	\$5,000	
Living & Overhead		\$15,000
6 months halftime	\$15,000	
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

One of first 15 employees. Founding Member, Intellectual Property Committee (1994). Project Coordinator, "Immersion," one of Interval's original projects (1993-1997). Responsible for building two 3D portable camera systems, two 3D interactive display systems, and exploring computer models made from camera-base imagery. Produced 2 art projects (See Banff Kinetoscope and Be Now Here) and mentored 2 (Rouen Revisited by Paul Debevec and Golan Levin, and Jam-o-Drum by Tina Bean Blain). Mentored 12 university interns. Published 29 trip reports. Applied for 6 patents (4 allowed to date). Co-Chair, Publications Committee (1998). Formed "Publications and Media" Committee after Interval closed to coordinate release efforts (2000). Instigated "Kundi.com," a spinoff venture based on a unique realtime alert system for webcams and live network media.

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

1980-81, 1991-92: MIT Media Lab
1987-90: Apple Multimedia Lab and Human Interface Group
1986-90: Lucasfilm Ltd., Nicosio, CA
1985-86: Panavision, Tarzana, CA
1982-84: Atari Research Lab, Sunnyvale, CA

And:

St. Louis Zoo (1989); Technology Center of Silicon Valley, San Jose (1989); City of Karlsruhe ZKM Advisory delegation (1988); Fleet Science Center, San Diego (1988); LA Open School (1988); Museum of Science and Industry, Chicago (1988); Advanced Interaction Inc., San Francisco (1987); Videodisc Publishing, Inc., New York (1987); HOK Associates, St. Louis (1987); Mattel Inc., Hawthorne, CA (1987); Lotus Development Corporation (w/The Future Squad), Cambridge (1987); NY Museum of Modern Art (1986); Advanced Decision Systems, Mountainview, CA (1986); Microsoft Corporation, Seattle (1986); Renan Productions, Los Angeles (1985); SF Museum of Modern Art (1985); Mirror Systems, Cambridge (1985); Lynn Hershman Projects, San Francisco (1984); Realtime Video Productions, San Francisco (1984); Bank of America, San Francisco (1983); Search and Design, San Anselmo (1982); WED Enterprises (Disney Research) (1982);, Glendale, CA; Office of the President, National Geographic Society, Washington DC (1981).

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

2001-2: Residency, Institute of Advanced Media Arts and Sciences (IAMAS), Gifu, JAPAN
 1993: Residency, "Art and Virtual Environments," Banff Centre for the Arts, CANADA
 1991: Residency, "Bioapparatus," Banff Centre for the Arts, CANADA
 1990: Residency, Zentrum für Kunst und Medientechnologie (ZKM), Karlsruhe, GERMANY
 1990: Visiting Faculty, "Immersive Virtual Environments," New Genres Department, San Francisco Art Institute
 1989: Visiting Faculty, "Virtual Environments," New Genres Department, San Francisco Art Institute
 1987: Residency, Exploratorium, San Francisco
 1987: Visiting Faculty, "Interactive Art," School of Creative Arts, San Francisco State University
 1986: Visiting Faculty, "Media Technology and the Arts," School of Creative Arts, San Francisco State University
 1986: Visiting Faculty, "Aesthetics of Interactivity," School of Film/Video, California Institute of the Arts
 1981-82: Visiting Faculty, "The Arts Today," School of Creative Arts, San Francisco State University
 1981: Visiting Faculty, "New Media and the Arts," School of Creative Arts, San Francisco State University
 1979-80: Research Fellow, Center for Advanced Visual Studies, Massachusetts Institute of Technology
 1978-79: Technical Instructor (film/video), Architecture Machine Group, Massachusetts Institute of Technology
 1977: Teaching Assistant, "Creative Seeing," College of Architecture, Massachusetts Institute of Technology
 1974-75: Instructor (video), Residential College and Department of Geography, University of Michigan
 1972-75: Instructor, Future Worlds Program, College of Literature, Science, and Arts, University of Michigan

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)
 1997: Nominee, Rockefeller Foundation Fellowship, New York (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: Recipient, 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

2004-2008: 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 (VSM) 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
 1999-present: Submissions Reviewer, Leonardo journal, MIT Press
 1993-present: Editorial Advisory Board, Leonardo Electronic Almanac, MIT Press
 1991-present: Editorial Board, PRESENCE, MIT Press
 1984-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

1993: Nominator, Interactive Media Festival, Los Angeles
 1993: Juror, Siggraph Multimedia Exhibition, Los Angeles
 1993: Guest Co-Editor, Wide Angle, vol. 15, no. 4, December 1993, John Hopkins University Press, Baltimore
 1991: Thesis Reviewer, SF Art Institute, New Genres
 1990: Steering Committee, Cyberthon Conference, Point Foundation, Sausalito
 1990: Advisory Group, "Reality on Wheels" VR Exhibition, The Computer Museum, Boston
 1989: Graduates Reviewer, Architecture Dept, Cal College of Arts and Crafts, San Francisco
 1988: Nominator, SECA Video Art Award, SF MOMA
 1988: Juror, San Francisco International Film Festival
 1987: Project Development Committee, "Anthropology" Television Series, Institute of Human Origins, Berkeley
 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. (2004), Addressing Time. Curatorial Statement for the Festival Symposium, *Ars Electronica 2004*, G. Stocker, Editor, Ostfildern-Ruit, GERMANY: Hatje Cantz Verlag
 Naimark, M., Sutton, G. (2004), Chronological Age: Ars Electronica's Timeline Project 1979–2003, *Ars Electronica 2004*, G. Stocker, Editor, Ostfildern-Ruit, GERMANY: Hatje Cantz Verlag
 Naimark, M. (2004), Calculated Risk. Forward for *A Guide to Good Practice in Collaborative Working Methods and New Media Tools Creation*, L. Goodman and K. Milton, Eds., Oxford, UK: Oxford University Press.

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Naimark, M. (2000). Memorial for Bernard Q. Nietschmann. (self published on www.naimark.net) U C Berkeley Faculty Club.

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Naimark, M. (1998). Field Recording Techniques for Virtual Reality Applications. *VSMM '98 Proceedings*, Gifu, JAPAN.

Naimark, M. (1998). Place Runs Deep: Virtuality, Place, and Indigenousness. *Virtual Museums Symposium Proceedings*, Arch Foundation, Salzburg, AUSTRIA.

Naimark, M. (1998). Art School en Provence. *Interval Research Trip Report*, Aix, FRANCE, 11/98.

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Naimark, M. (1998). World's First Interactive Filmmaker. *Interval Research Trip Report*, Prague, CZECH, 5/98.

Naimark, M. (1998). Prix Ars Electronica Jury. *Interval Research Trip Report*, Linz, AUSTRIA, 5/98.

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Naimark, M. (1997). What's Wrong with this Picture: Presence and Abstraction in the Age of Cyberspace. *Consciousness Reframed Proceedings*, CAiiA, University of Wales, Newport, WALES.

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- Naimark, M. (1996). ATR Science ART: International Symposium on Art and Science. *Interval Research Trip Report*, Kyoto, JAPAN, 5/96.
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Naimark, M. (1989). The Visual Almanac. Interactive Videodisc (Director of Production). Apple Multimedia Lab, San Francisco.

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Naimark, M. (1984). Siggraph '84 Timelapse. Video (Producer/Director), ACM Siggraph, Minneapolis.

Naimark, M. (1984). Illustration Library Workstation. Video (Director). Atari Research for the National Geographic Society, Sunnyvale.

U.S. Patents Granted

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Naimark, M., Felsenstein, L. (1997). Panoramic display with stationary display device and rotating support structure. US Patent 5601353 (from Be Now Here art project).

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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 für 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)
 2000: ArtSale 2000, The Lab, San Francisco (Predictions)
 1998: Inventing Experience, The Tech Museum of Innovation, San Jose (See Banff and Be Now Here)
 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: Old Glory, Capp Street Project, San Francisco (No State)
 1994: International Symposium on Electronic Art (ISEA) 94, Museum of Contemporary Art, Helsinki, FINLAND (See Banff)
 1994: Mill Valley Film Festival (See Banff)
 1994: Walter Phillips Gallery, Banff Centre for the Arts, CANADA (See Banff)
 1994: Film Academy (w/ISEA), St. Petersburg, RUSSIA (Virtuality, Inc.)
 1993: Multimediale 3, Zentrum für Kunst und Medientechnologie (ZKM), Karlsruhe, GERMANY (EVE project)
 1992: G-Tech Exhibit, Siggraph '92, Chicago (Field Recording Studies)
 1992: The Culture and Science of Finding Your Way, Exploratorium, San Francisco (Karlsruhe Moviemap)
 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: Tomorrow's Reality Gallery, Siggraph '91, Las Vegas (EAT and Karlsruhe Moviemap)
 1991: MultiMediale 2, Zentrum für Kunst und Medientechnologie (ZKM), Karlsruhe, GERMANY (Karlsruhe Moviemap)
 1991: Art and Multimedia, Center for Advanced Visual Studies (CAVS), MIT (compilation video)
 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)
 1989: Exploratorium at the World Financial Center, New York (Golden Gate Flyover)
 1988: Exploratorium at the Kennedy Center for the Performing Arts, Washington, DC (Golden Gate Flyover)
 1987: The Situated Image, Mandeville Art Gallery, UC San Diego (Computer Eyepiece)
 1986: Silicon Valley Electronic Arts Festival, Institute of Contemporary Art, San Jose (Computer Eyepiece)
 1986: American Association of Anthropology (AAA) annual conference, Philadelphia (compilation video)
 1986: Art New Vision '86, Nippon High Technology Arts Festival, Tokyo, JAPAN (compilation video)
 1985: US Pavilion, 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 Artshow, Detroit (Computer Eyepiece)
 1982: Palo Alto Film Festival (All My Worldly Things)
 1981: SF Art Institute Film Festival (Eyepiece and Moving Movie)
 1981: Centervideo, American Center, Paris, FRANCE (Babies on the Subway)
 1981: CenterVideo, Koelnischer Kunstverein, Cologne, Germany (Babies on the Subway)
 1981: CenterVideo, Kunsthhaus, Zurich, SWITZERLAND (Babies on the Subway)
 1980: New York Avant Garde Festival (Eyepiece)
 1980: Beyond Object, Aspen Art Museum (Moving Movie)
 1980: Council for the Arts annual meeting, MIT (Talking Head)
 1980: SF Art Institute Film Festival (All My Worldly Things)
 1980: CenterScreen Series, Harvard University (All My Worldly Things)
 1979: Ann Arbor Film Festival (All My Worldly Things)
 1978: The Mall, Washington, DC (Centerbeam)
 1977: Documenta 6, Kassel, GERMANY (Centerbeam)

Invited Presentations

195 (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
 191 (02/04): Dolphin Cognition Workshop, Wildlife Conservation Society, NYC Zoo, New York
 190 (01/04): Interactive Media Division, USC School of Cinema-Television Visiting Speaker Series

189 (11/03): Role of the Arts in a Research University (open mic statement to the Presidents of NYU and Columbia), NYU
 188 (11/03): National Art and Technology Network meeting, Arizona State University, Tempe
 187 (10/03): Intro Class, Interactive Telecommunications Program (ITP), NYU
 186 (06/03): ZeroOne Foundation, Palo Alto
 185 (06/03): Intel Research Invited Seminar Speaker Series, Berkeley
 184 (04/03): Exploratorium, San Francisco
 183 (04/03): Friday Seminar Series, Interactive Telecommunications Program (ITP), NYU
 182 (02/03): TTI Vanguard Conference, San Jose
 180 (01/03): Dublin Arts and Technology Association (DATA), Dublin, IRELAND

 179 (10/02): Computer Art Department, School of the Visual Arts (SVA), New York
 178 (10/02): Intro Class, Interactive Telecommunications Program (ITP), NYU
 177 (10/02): Future Cameras, Computer Science Department, NYU
 176 (04/02): Art, Technology, and Culture Colloquium, UC Berkeley
 175 (04/02): Numer.02 Interactive Design Conference, Centre Pompidou, Paris, FRANCE
 174 (04/02): Media Lab Europe, Dublin, IRELAND
 173 (04/02): Digital Arts Symposium, College of Fine Arts and Center for Consciousness Studies, U Arizona, Tucson
 172 (01/02): InterMediun Institute, Osaka, JAPAN

 171 (12/01): DoCoMo House, Keio University, Tokyo, JAPAN
 170 (11/01): Ways of Working Seminar, Arts Council of England, London, UK
 169 (11/01): Future of Creativity Symposium Discussant, AAC / School of the Art Institute, Chicago
 168 (10/01): Embedding Media in Culture Panel, Interaction '01, IAMAS, Gifu, JAPAN
 167 (10/01): International Academy of Media Arts and Sciences, Gifu, JAPAN
 166 (06/01): Bridges Symposium, USC / Banff Centre, Los Angeles
 165 (02/01): Center for Digital Media, SF Art Institute

 164 (11/00): Art Frontiers: Partners in Art and Industry Symposium, Ground Zero / The Kitchen, Menlo Park, CA
 163 (10/00): Arts Panel, First MIT Media Lab Reunion
 162 (10/00): Looking at San Francisco Panel, "Really Wired" exhibition, New Langton Arts, San Francisco
 161 (10/00): Master Viewpoints Presentation, Edgewise Conference, New York
 160 (05/00): Green Interfaces Panel, Planetnetwork Conference, Presidio, San Francisco
 159 (05/00): Bernard Q. Nietschmann Memorial, Faculty Club, UC Berkeley
 158 (05/00): Center for Interactive Art, SFSU
 157 (04/00): Digital Work and Play Symposium, Mission College, Santa Clara
 156 (03/00): At What Stage Art and Technology Symposium, The Kitchen, New York
 155 (03/00): Design Department, UCLA
 154 (02/00): Art Dept, Mills College, Oakland
 153 (02/00): New Media: Where To Now? Panel, The Lab, San Francisco
 152 (02/00): Computer Science Department, UNC, Chapel Hill

 151 (06/99): Design Digital Theme, International Design Conference, Aspen
 150 (04/99): Lannan Foundation, Geography Dept, UC Berkeley
 149 (03/99): Arts Dedication Ceremony, The Tech Museum of Innovation, San Jose

 148 (11/98): Artists and Technologists Working Together Panel, ACM UIST Conference, San Francisco
 147 (11/98): Ecole des Beaux Arts Aix en Provence, FRANCE
 146 (11/98): VSMM '98, Gifu, JAPAN
 145 (09/98): Center for Advanced Visual Studies (CAVS) Series, MIT
 144 (05/98): Virtual Museums on the Internet Symposium, Salzburg, AUSTRIA
 143 (04/98): Scripted Spaces Conference, Art Center, Pasadena
 142 (03/98): Design Department, UCLA
 141 (02/98): Spatial and Collaborative Cinema Panel, International Film Festival, Rotterdam, NL

 140 (12/97): Conceptual Design/Information Arts Dept, SFSU
 139 (11/97): Global Jukebox presentation, ITP, NYU
 138 (10/97): Art Dept, UC Santa Barbara
 137 (10/97): Multimedia Series, Santa Barbara Community College
 136 (10/97): Art Dept, Art Center, Pasadena
 135 (10/97): Virtual Worlds Beyond the Screen Lecture Series, SF MOMA
 134 (09/97): Telepresence Panel, International Symposium of Electronic Art (ISEA), Chicago
 133 (08/97): Multimedia Studies Program, SFSU
 132 (07/97): Consciousness Reframed Conference, CAiA, University of Wales, Newport, WALES
 131 (06/97): Multimedia Summit, Banff Centre for the Arts, CANADA
 130 (02/97): Stereoscopic Displays and Applications, SPIE, San Jose
 129 (02/97): Fleming Fund Dinner Series, Villa Montalvo, Saratoga, CA
 128 (02/97): New Genres Dept, SF Art Institute
 127 (02/97): Computer-Related Design Dept, Royal College of Art, London, UK

 126 (11/96): Visual Research Conference (SVA), American Anthropological Assn Annual Meetings, San Francisco
 125 (09/96): Digitale '96, Media Academy, Cologne, GERMANY
 124 (05/96): Art@Science Symposium, Advanced Telecommunications Research (ATR), Nara, JAPAN
 123 (05/96): International Academy of Media Arts and Sciences (IAMAS), Gifu, JAPAN
 122 (05/96): Center for Design Research, Stanford University
 121 (04/96): Arts Dept, UC Santa Cruz

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 (11/95): 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 Ferrara/UC Berkeley, Bologna, ITALY
 109 (05/94): Art and Virtual Environments Symposium / Cyberconf 4, Banff Centre, CANADA
 108 (04/94): Center for Digital Multimedia, NYU
 107 (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): CyberArts 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
 59 (10/89): Avenues Toward Artificial Reality Panel, Intertainment '89 conference, New York
 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
 54 (10/88): Production Issues Panel, Intertainment '88 Conference, New York
 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
 15 (07/82): World Future Society Fourth General Assembly, Washington DC
 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