## UNTITLED

## Robot Ballet

Composer: Michael McNabb Choreographer: Brenda Way Dancers: ODC/San Francisco Robots: Veterans Administration

## presented by:

Center for Computer Research in Music and Acoustics, Stanford University

The Lively Arts at Stanford

ODC/San Francisco

Rehabilitation Research and Development Center, Veterans Administration

PREMIERE PERFORMANCE

Saturday, October 12, 1986

Memorial Auditorium, Stanford 8:00 P.M.

#### THE PROJECT

A unique performance of music and dance is planned for an October premiere performance at Stanford University. The performance will be made possible through the collaboration of composer Michael McNabb, the Center for Computer Research in Music and Acoustics (CCRMA) at Stanford, The Lively Arts at Stanford, ODC/San Francisco, the Rehabilitation Research and Development Center of the Veterans Administration Medical Center in Palo Alto and the Mechanical Engineering Department at Stanford University.

A musical composition by Michael McNabb conceived in the ballet form will be performed by ODC/San Francisco, with choreography by their artistic director, Brenda Way. The ballet will include a truly novel element, the performance of integral dance movement by sophisticated robotic devices.

The music will be performed by two musicians performing on piano and saxophone, accompanied by a digitally-recorded orchestra of computer synthesis instruments and modified environmental sounds. The sounds of both the live instruments and the recorded synthesis will be transformed onstage by digital signal processors, and amplified by a state-of-the-art sound reinforcement system. The work will consist of 5 distinct movements, with a total length of approximately 40 minutes. The movements will be highly contrasting in style, rhythm, and color, and are designed to play a highly interactive role with the dance.

The robots, an arm and a mobile base, are part of a collaborative project underway between Stanford and the Veterans Administration Rehabilitation Research and Development Center in Palo Alto. This project aims at the development of an intelligent manipulation aid for severely disabled people. Programming the robots to dance is seen as a natural extension of a concern for the quality of their movement. The dance choreographer is challenged to explore the potential of these machines for artistic expression.

This performance will be the first time robotic devices will be used in a public dance performance. The full work, with robots is scheduled to go on tour with the ODC/San Francisco Company during their 1986-87 touring season.

## COMPOSER MICHAEL MCNABB

Michael McNabb was born in Salinas, California, in 1952. He holds a doctorate in composition from Stanford University where he studied with Leland Smith and John Chowning. He also studied with Betsy Jolae at the Paris Conservatory.

In addition to the National Endowment for the Arts Fellowship in composition which Michael received for the creation of the music for this ballet, he has received numerous other awards. In addition to a second National Endowment for the Arts award in composition he has also received the Electroacoustic Music Festival of the Groupe de Musique Experimentale de Bourgee Award (twice), the National Composer's Competition of the League of Composers/International Society for Contemporary Music Award and the Georges Lurcy Trust Award.

McNabb's computer music is performed and broadcast regularly world-wide. A digital recording entitled "Michael McNabb - Computer Music" is available on 1750 Arch records, number S-1800, and on compact disc from Mobile Fidelity Sound Labs, number MFCD-818. The compact disc is the first music recording ever produced in a entirely digital form from start to finish. The concerts and recordings have received numerous enthusiastic reviews.

McNabb began working at CCRMA in 1976, when composers and programmers were still laying the groundwork for computer music. He has taught courses in music theory and computer music at Stanford and has composed computer music for films and modern dance. He continues to work at CCRMA as a guest composer and contributing programmer, while also holding a position as a knowledge engineer at IntelliCorp, an artificial intelligence software company.

## Quotes:

Andrew Porter, The New Yorker:

"Michael McNabb's very attractive "Dreamsong" ... has become something like a classic of the genre."

Alan Rich, Newsweek:

"McNabb ... uses his electronic helpmate in a wide variety of shapely pieces, some quite witty, all aglow with light and color."

Hewell Turciut, San Francisco Examiner:

"McNabb's highly imaginative juxtaposition of recognizable materials, tonal images, and pure computer sonics proved to be the evening's great hit.
... What one experienced was McNabb's keenly artistic levels of taste and proportion.

## CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS (CCRMA)

CCRMA is an interdisciplinary facility where composers and researchers work together using the computer as a new musical and artistic medium and as a research tool. Areas of ongoing research and development at CCRMA include: digital synthesis, signal processing, psychoacoustics, interactive composition, graphics, digital recording and editing, and musical intelligence.

Work in computer music began at Stanford University in 1964 by John Chowning. Initial funding for the Center for Computer Research in Music and Acoustics was received in 1975 with a joint grant from the National Science Foundation and the National Endowment for the Arts. This funding supported initial equipment acquisition and research support for a small research staff which included faculty members John Chowning and Leland Smith and research associates John Grey, James A. Moorer and Loren Rush.

Funding for ongoing work at CCRMA has been received from the California Arts Council, the National Endowment for the Arts "Centers for New Music Resources" program, the National Science Foundation, the Rockefeller Foundation, the System Development Foundation, Yamaha, and from private gifts. These grants have provided technical support, research support, support for visiting composers, and additional equipment.

The center has close ties with, and has served as the prototype or impetus for computer music facilities at Columbia, Colgate, Clark, Carnegie-Mellon, Michigan State, MIT, U.C. San Diego, Queen's University (Kingston, Ontario), Lucasfilm, Ltd (Marin County), and Yale University. A close association with IRCAM (Paris, France) was proposed as early as 1974 by its director, Pierre Boulez. It has developed into strong and fruitful interactions through the exchange of research ideas, results and personnel.

CCRMA has become one of the major centers for computer music in the United States. Currently there are 56 active users at CCRMA including: 18 faculty, staff and research associates, 21 graduate students, and 15 foreign and domestic guest composers/researchers. Activities at CCRMA include teaching, research, composition, interactive performance, workshops, presentations, concerts, and recordings.

## CHOREOGRAPHER BRENDA WAY

Ms. Way began her dance training at the New York City School of American Ballet and Ballet Arts. Important modern dance influences include Jean Erdman, Eric Hawkins and Twyla Tharp. She has taught ballet and modern dance in Europe at Le Centre Americain in Paris, France, and in colleges and universities across the United States. Ms. Way also holds a Ph.D. in aesthetics.

In 1971, while a Professor of Dance at the Oberlin College and Conservatory of Music, she founded the Oberlin Dance Collective as a touring outlet for new performance work developing among her students and colleagues. In 1976, Ms. Way and the Oberlin Dance Collective relocated to San Francisco to establish permanent residence. Here Ms. Way continues to teach the ODC technique that is the result of her extensive training in both ballet and modern dance.

Recipient of numerous choreographic fellowships, awards and Commissions, Ms. Way has produced thrity-five dance works over the last fourteen years. Her choreographies have gained national exposure through the extensive touring schedule of ODC/SF, commissions and the Company's participation at important arts festivals such as the Los Angeles Olympics and the Spoleto Festival U.S.A.

She continues her commitment to the development and production of work that is characterized by a rigorous concern for form, an athletic movement style, and a delight in the unconventional. While much of her work can be viewed as "post-modern", her interest in experimentation has not dimished her demand for technical excellence or her concern for the audience; she produces dance work that is challenging as well as appealing. European audiences will have the opportunity to see Brenda Way's artistry during ODC/SF's planned tour of France and Italy in the Spring of 1986.

Brenda Way currently sits on the Dance Panel of the California Arts Council, the Community Arts Distribution Committee of the Zellerbach Family Fund and the Technical Assistance Panel of the Yerba Buena Project. She has previously served on the Dance Panel of the National Endowment for the Arts.

#### ODC/SAN FRANCISCO

ODC/San Francisco was founded as the Oberlin Dance Collective in 1971 by Brenda Way. The company served as a performing outlet for dancers, musicians and visual artists at Oberlin College and gradually built a national and local reputation for adventure and excellence. The company's professional stature and artistic aspirations soon outgrew the esthetic limitations and critical isolation of a Midwestern college town. In the spring of 1976, the Oberlin Dance Collective relocated in San Francisco hoping to become part of the city's broader and more challenging artistic community.

Soon after arriving in San Francisco, the ODC took its place in the city's dance and performance world by establishing a full teaching curriculum, an interdisciplinary performance series, an arts journal, a regular Bay Area performance schedule and by opening its performance space to other local and visiting performers. The company continued to build its recognition as an important contemporary dance company through the Dance Touring Programs of the NEA and CAC. This reputation continues to grow as the company and its four choreographers are invited to special events and festivals in California and on the East Coast.

In July, 1979, the ODC purchased the building and adjacent lot at 3153 17th Street in San Francisco, making a more permanent commitment to the city of San Francisco and becoming one of very few dance companies to own its own facility. In 1982, a two-story office and studio annex was completed, and the ODC sold partial ownership of the facility to the Margaret Jenkins Dance Company. The two companies contracted management and operations of the facility to the New Performance Gallery, Inc. with the intention that the building house both companies and continue the ODC tradition of presenting a diverse program of new performing arts to San Francisco audiences.

This action permitted both the staff and the Board of Directors of ODC to focus energy on support and development of the creative and performing activities of the company. In 1983, and again in 1984, the company presented major home seasons on proscenium stages which permitted new artistic exploration to ODC choreographers and dancers at the same time that it expanded Bay Area audiences.

As a final commitment to its identification as part of the San Francisco cultural community, in 1984 the Oberlin Dance Collective changed its name officially to ODC/San Francisco.

Today ODC/San Francisco continues annually to perform two Bay Area seasons which premiere the new work of its four choreographers, Brenda Way, Katie Nelson, Kimi Okada and Pam Quinn, and to tour nationally five to seven weeks each year. In 1984 tour bookings increased 500% and included a 14 day tour of Alaska.

The company's mission, as stated in its long range plan, is "to generate, under the guidance of the artistic director, a creative, flexible and stable environment in which its choreographers may explore, develop and realize their art by developing a fully professional, trained company with which to perform the works of the choreographers, building committed audiences for the company locally, nationally and internationally and by providing an institution foundation capable of managing and supporting the programs of the organization."

Recent company engagements include the Joyce Theatre in New York City, a four performance run at the Herbst Theatre in San Francisco, the San Francisco Symphony's Black and White Ball, Ford's Theatre in Los Angeles and the Spoleto Festival, USA.

The robots playing in this performance are part of a research project funded by the Veterans Administration in collaboration with Stanford's Mechanical Engineering Department under the direction of Professor Larry Leifer. This project aims at the development of an intelligent manipulation aid for severely disabled individuals. The robot being developed would be able to fetch, grasp, carry and serve objects which are inaccessible to a high-level quadriplegic "for example". The Robotic Aids Project has supported informal explorations by designers and choreographers into the expressive potential of the robot arm since the project began. The first piece of "robot ballet" was programmed in 1978, and now there are several choreographers working with the machine.

This exploration is valuable to the Robotic Aids Project because

- it addresses qualitative issues in the design of the robotic aid. The way this machine moves is very much a part of its character as a personal "living aid."
  - (The comprehensive design of any product would naturally attend to the quality of its form, scale, finish and even sound. In the robot we have a product which also moves, and the quality of its movement is an especially important design concern. We look to choreographers for their expertise in quality of movement.)
- it gives potential users a way of seeing the robot as something positive and it supports acceptance of this machine as an assistive device.
- it demonstrates the robot's potential as an expressive tool for someone having very limited means of non-verbal expression.

  (Who has not, at one time or another, expressed frustration or excitment through the simple act of setting down a cup? Individuals with a high level of disability have few such means of non-verbal expression.)
- it challenges the capabilities of the human interface to the robot and provokes innovative thinking about how to command robot movement.

The Robotic Aids Project is based at the Rehabilitation Research and Development Center, Veterans Administration Medical Center, Palo Alto. This research project supports development of the collaborative music and dance performance by providing access to hardware and technical advice.

## THE LIVELY ARTS AT STANFORD

The Lively Arts at Stanford is organized to offer professional performing arts presentations featuring the finest musicians, actors and dancers. The program is committed to performing a more serious public service than entertainment. The offerings are recreation in the true sense of the word, designed not only to entertain, but also to educate and to awake a deeper appreciation in the audience.

The Lively Arts, as the major presenter in the Midpeninsula, is a community resource not offered by other groups. The professional artists, serving as performers and educators, complement the amateur and participatory local groups. There is a deliberately broad mix of performers, to further diversify the available cultural activities. The Lively Arts includes not only popular performers presenting familiar works, but also young artists and companies, and those whose art is less widely accepted.

The Lively Arts presents 35-45 performances, serving a total audience of over 38,000. Approximately 60% of the audience are community residents, rather than faculty, students, or staff. Ticket prices cover only about 60% of costs.

To further involve the community with the Lively Arts, both as participants in activities and as a base of support, the Community Outreach Program was established in 1977 with a grant from the San Francisco Foundation. The outreach effort brings "artists-in-residence" to the community schools and centers to work more closely with smaller groups in a participative style that seeks to convey more directly elements of the creative and artistic process. The program is administered by the Community Outreach Coordinator. By working carefully with artists, managers, community and school leaders, the coordinator ensures that each artist is placed in the situation which will yield the greatest educational results. The coordinator meets regularly with the Senior Coordinating Council, the Master Class Committee, the Advocates for School Arts Programs, and the University Resident Assistants, to plan and evaluate activities. The coordinator prepares inservice materials which teachers use to integrate the mini-concert into the regular school curriculum.

## SUPPORT RECOGNITION

The unique concept of robot dancing has already begun to stir great interest in the press. Pre-performance publicity in the form of new releases, in-progress updates of the production, and feature stories with the composer, choreographer and robotic research team will give opportunities to publicize Foundation and Corporate sponsors of the project. Discussions with KQED-9, Public Television are in progress with the potential of production and performance coverage being developed for broadcast. Scholarly papers in the areas of computer music research, computer research and mechanical engineering research are also currently in discussion.

# Rudolf 'Robot' Nureyev?

Mechanical marvels may soon be dancing the night away.



Gayle Curtis find robots a bit disarming

By Paul Hertelendy Mercury News Dance Writer

HE world of automation is attempting something long? regarded as nutty or unlikely: teaching robots to dance and move, but gracefully.

The dance debut of the robot in concert could be as early as October right here in the Bay Area, under the auspices of Stanford University's Lively Arts. According to Lively Arts. representative Lois Wagner, another \$30,000-\$45,000 remains to be raised toward the necessary \$70,000 of the total budget. The expenditure involves everything from (live) dancers' fees

to robot-programming to costuming the automatons.

The dancing robots are commercial models, on loan from a research group at Palo Alto's Veterans Administration Hospital. The live dancers collaborating are the San Francisco Oberlin Dance Collective. And the electronic music accompaniment - you wouldn't expect a robot to keep time without music, would you? - would be original computer-music

Continued on Page 2C

Saturday, May 4, 1985 E San Jose Mercury News

## Cover Story

# Robots may soon bolt across the dance scene

Continued from Page 1C compositions created at Stanford

by Michael McNabb, who received a \$10,000 National Endowment for the Arts grant.

Choreographing the collaboration of live dancers and robots will be Brenda Way, veteran director of the Oberlin group. Way hopes to take the new work on tour, both in the U.S. and in Europe next season, with her seven live dancers and . three robotic devices

The modus operandi of the robotic ballet is to program the robots to move not only gracefully, but also in synchronous motion with the beat of the music. The feasibility of this to piano music of Chopin has already been shown in video

tapes prepared at the hospital's Rehabilitation Research and Development Laboratory.

These demonstrations are dazzling in the poetic movement of the robot arm, geared to the tempo of the music. Gayle Curtis, research biomedical engineer at the laboratory and programmer of these devices, essentially can give the robot for each move a Position A, a Position B, and a set time span to move from one to the other. The robot then in effect takes a straight-line route between A and B, without missing a step.

It's much too early to order tickets for these mechanical Pavlovas. "All three phases of this project (programming, composition and choreography) are in development," cautions Curtis.

If fund-raising is far enough along, he plans to start formally on July 1. As for choreographer Way, before she begins on this five-part, 45-minute piece she will have to bring her live troupe back from a Midwestern tour and complete the May 29-June 2 performances in San Francisco's Herbst Theater.

Curtis' lab is unaccustomed to



dabbling in dance, working mainly in devices to assist the severely handicapped. He sees a natural tie-in of robotic dance, however,

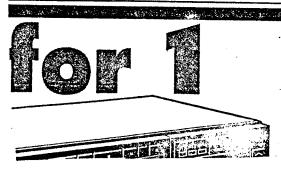
"Quality of movement is a factor, especially if we have robots as living aids in the home. A high quality of movement gains accep-tance among the disabled. In this area the experts are the choreog-

"Finally, the research is geared to total movement (i.e., shaping), rather than just the point-to-point

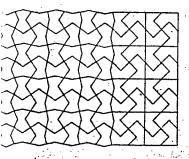
All these human engineering questions have great relevance for robotic design. And who knows? Perhaps the little home robot that you have in the year 2001 for your grocery-shopping and emptying your garbage will also be able to

dance an evocative Isadora Duncan impression at the press of a button.

It's a distant dream still. Even the smaller programmable robot arms cost \$40,000 today. Research, however, is making the robot not only more versatile, but more human, and therefore more acceptable among skeptical



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nlike the parquet deformations, hich change with time, Golomb's aster changes with distance.

ACCORDING to Huff, the raster xplores the discrepancies between ne world as it is and the world as: e perceive it. He points out that in ay-to-day life it is important for us make instantaneous decisions ased on how we perceive reality. le must do this in order to survive.

"But," Huff notes, "these deciions aren't 100 percent correct. here is a discrepancy. That's the ind of problem I explore in terms f perception."

The raster uses such discrepanies to create shifts in the viewer's erception of it. Such a design calls ttention to what Huff calls "the ap between the physical and the

Architect and designer William uff is also a teacher, and the paruet deformation, the raster, and ne other exercises from his course : Basic Design are fascinating aching tools. They teach the eleents of design and, perhaps more nportantly, they teach students ow to observe and evaluate visual aterial and how to think through esign problems by putting geomeies together, a skill that, in Huff's ords, calls for "a special magic."

And by studying these finished orks, the viewer also learns someing about how the human eye es and how the human mind

# 's a Star

Avant-artists Keith Haring and enny Scharf left their colorful arks on various walls, but the b is about fashion - not art," usic or dancing.

What effect will it have on New ork night life? Says designer Bety Johnson, "I'm going to have to v more clothes.'

Los Angeles Times Syndicate

# Robot Dancing Class May Benefit People

By PAUL HERTELENDY

Knight News Service

SAN JOSE, Calif. — The world of automátion is attempting something long regarded as nutty or unlikely: teaching robots to dance and

move, but gracefully.

The dance debut of the robot in concert could be as early as October in the San Francisco Bay Area, under the auspices of Stanford University's Lively Arts. According to Lively Arts representative Lois Wagner, another \$30,000-\$45,000 remains to be raised toward the necessary \$70,000 of the total budget. The expenditure involves everything from (live) dancers' fees to robot programming to costuming the automatons.

The dancing robots are commercial models, on loan from a research group at the Veterans Administration Hospital in Palo Alto, Calif. The live dancers collaborating are the San Francisco Oberlin Dance Collective. And the electronic music accompaniment you wouldn't expect a robot to keep time without music, would you? would be original computer-music compositions created at Stanford by Michael McNabb, who received a \$10,000 grant from the National Endowment for the Arts.

Choreographing the collaboration of live dancers and robots will be Brenda Way, veteran director of the Oberlin group. Way hopes to take the new work on tour, both in the United States and in Europe next season, with her seven live; dancers and three robotic devices.

THE ROBOTS will not resemble "Star Wars" C3P0. But two of the models bear a crude similarity to R2D2, barrel-sized "mobile bases". rolling about silently on three wheels each, with instructions prestored in their memories as well as transmitted by radio antenna. The second model type is a 67-inch-long arm with six "joints" or axes known commercially as Unimation Corporation's PUMA 560, with each of the axes' moves precisely programmable on a computer.

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It's much too early to order tickets for these mechanical Pavlovas. "All three phases of this project (programming, composition and choreography) are in development," cautioned Curtis. "And part of it will be to develop sophisticated (robotic) choreography."

If fund-raising is far enough along, he plans to start formally on July 1. As for choreographer Way, before she begins on this five-part, 45-minute piece, she will have to bring her live troupe back from a Midwestern tour.

CURTIS' LAB is unaccustomed to dabbling in dance, working mainly in devices to assist the severely handicapped. He sees a natural tiein of robotic dance, however.

"Our charter calls for humane: applications of technology; designers need to consider human values," he said. "Quality of movement is a factor, especially if we have robots as living aids in the home. A high quality of movement gains acceptance among the disabled. In this area, the experts are the choreographers. Finally, the research is geared to total movement (i.e., shaping), rather than just the point-to-point approach."

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## Dance Review



Katie Nelson, Robert Moses Jr. of ODC/San Francisco

# Robot' troupe proves very lively indeed

By Paul Hertelendy Mercury News Dance Writer

SAN FRANCISCO

HE people who will perform in Stanford's robotic dances — tentatively set for October — aren't robotic at all. Their current performances at Herbst Theater show them getting a kick out of dance, without mechanism, without anxiety, without cramps, without remorse.

The troupe is ODC/San Francisco, formerly known as the Oberlin Dance Collective. Its modern dances are human, ingratiating and nicely curved, with symme-

nothing of the post-modern minimalism that seems to be the reigning fad.

Choreographer-director Brenda Way, who founded this troupe in Ohio 15 years ago before bringing it permanently to San Francisco, is nobody's copycat. Her nine-member company is marvelously disciplined and their coordinated moves are so cohesive that each leads naturally to the next.

On stage, the dancers form a well-adjusted society of interactive people harmonizing and celebrating the harmony with a serene, well-channeled vitality. It's supremely refreshing after all the

# It's a troupe that's ready for touring

Continued from Page 10D

angst and alienation flaunted on the dance stage by others.

The current program has at its focus Way's new "Natural Causes," a piece somewhat in the Alvin Alley mold, performed by an almost-all-white ensembl. Way zently tweaks the nose of convention; when she does a segment for two couples, they are not only interracial, but one is boy-boy, the other-girl-girl. And they are like ireely interchangeable parts.

In fast year's "Entropics," being

In last year's "Entropics," being revised on this program, Way comes up with a Caribbean milien piece and an ingenious two-edged title. Speel-drum music and overhead fans set the scene for a warm-hearted, full-company interplay. The commissioned (recorded) score by Andy Narrell was adroit, leaving latitude for northern-latitude moods along with the Caribbean sunniness.

'Katie Nelson's new "Wild Card" had a purposeful, jerky nuttiness that struck me as a lot of frenzy with little effect. She had zany automatons trying to act human (a study for the robotic dances, perchance?) and a dreadful commissioned score by Bobby McFerrin, consisting largely of rhythmic Bronx cheers and razzberries.

This is decidedly a high-quality, touring-caliber troupe, with a grand sense of ensemble and a captivating spirit. Brenda Way can move the dancers about artfully, and I love to watch them, particularly given the lighting design (K.H. Elliott) and sets (by various people).

For jazz Ians at Wednesday

For jazz fans at Wednesday night's opening, there was even a live"jazz-scat-blues-gospel singer named Rhiannon (from the group Alive!) doing her compositions, sometimes under a bigger spotlight than the dancers themselves had.

ODC/SAN FRANCISCO, dance troupe of nine, Brenda Way director-characographer. Program being repeated nightly through Saturday, 8 p.m. (but Rhiannon live only Saturday hight). Herbst Theater, 401 Van Ness, San Francisco. \$7.50-16. Call (415) 392-4400, Teletron or Bass.

## PRODUCTION SCHEDULE

July 22-27, 1985

Brenda Way and dance experimentation with robots and work with programmer on current robotic capabilities.

August 1-31, 1985

Full company into rehearsal for creation of the work

September 1-30, 1985

Complete programming of robots

October 7-11, 1985 Final production work, rehearsals and dress rehearsals

October 12, 1985 World Premiere of work

## PROJECT BUDGET

## EXPENSES

Composer Michael McNabb	\$10,000	
Choreographer Brenda Way	5,000	
Computer Programmer	8,000	
Computer Hardware Development	4,000	
Costume Designer	2,000	
Lighting Designer	2,000	
ODC/SF dancers development and rehearsals	21,240	
ODC/SF performance fee	4,000	
Production Stage Manager	2,100	
ODC/SF Administrative	1,240	
ODC/SF Mileage costs, choreographer & dancers	1,360	
Costume and lighting designers travel & per diem	2,500	
Dancer costumes	3,150	
Robot Costumes	1,500	
Lighting/production supplies	1,000	
Computer Hardware		
Mobile mount for robot	1,200	
Audio Synchronization System	600	
Software Development System	7,000	
Promotion	6,000	
Local Production Costs	10,000	
Total Expenses		\$93,890
INCOME	-	
Ticket Sales	14,400	
National Endowment for the Arts	10,000	
California Arts Council	13,500	
Foundation and Corporate Contributions	55,990	
Total Income		<b>\$93,89</b> 0
TOTAL THEOME		495,090