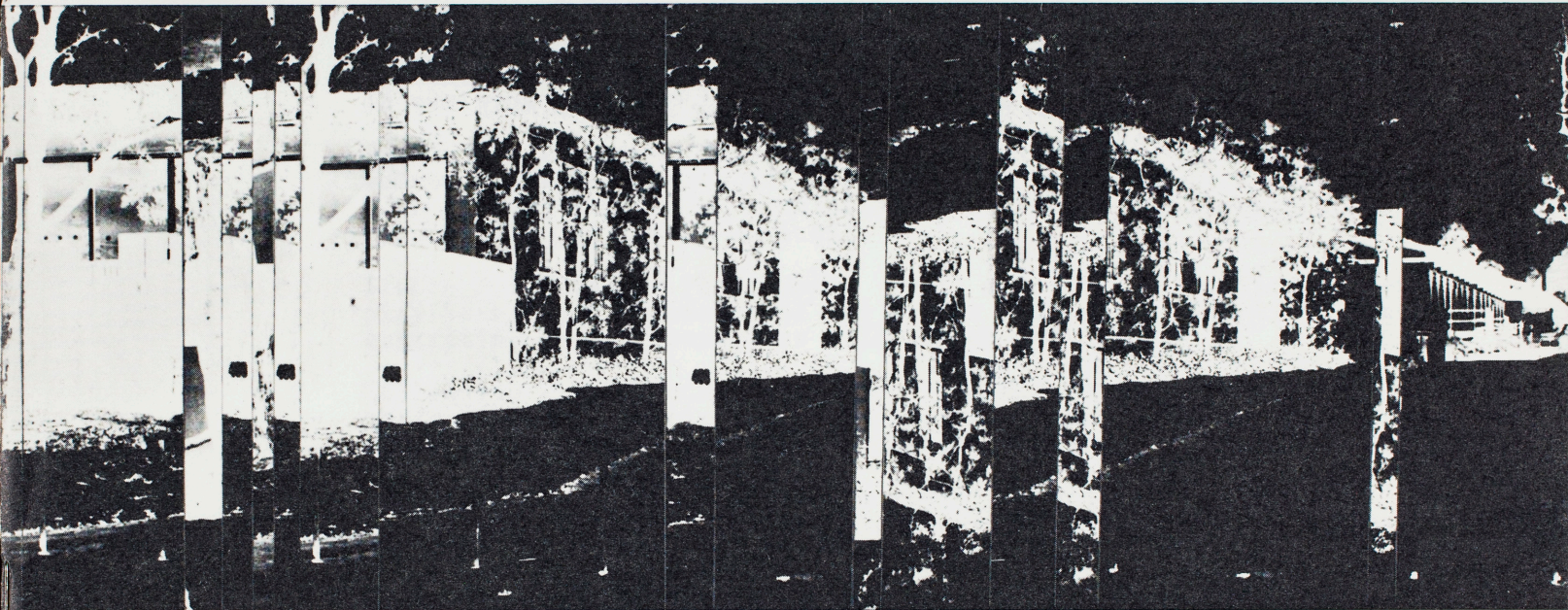


# VISUALS AND VOICES

SYMPOSIUM: 11 February - 22 February 1974



## CENTER FOR MUSIC EXPERIMENT

University of California at San Diego

La Jolla, California 92037

CREDITS:

Charles Cox of the Office of Learning Resources, UCSD, for consultations on television installations

Dr. M. V. Mathews for supplying one of Bell Telephone Laboratory's artificial larynxes

David Ross of the Everson Museum of Art, Syracuse, for consultation on video art

Karen Reynolds, Symposium brochure design and cover design

Alan Johnson and Roger Reynolds, Symposium brochure material compilation and editing

The Center for Music Experiment and Related Research (CME) at UCSD was initiated through a grant from the Rockefeller Foundation and is evolving as a continuous process based on four components:

Studio for Technical Research - will examine the relationship between various aspects of technology and the needs of the arts, both through experiment with existing equipment and through the construction of custom devices.

Studio for Extended Performance - will establish a practical interplay between the research of the artist and of the scientist, concentrating on performance as evidence of its efforts.

Colloquium - will focus on current interdisciplinary expertise in musico-theatric activity, technological innovation, and demonstrations which will be held on an occasional basis.

Documentation - functions in two ways: recording and archiving the activities of the Center, and providing public access to these materials through occasional publication.

Members of the CME Advisory Committee: James Campbell, Robert Erickson, Peter Farrell, Kenneth Gaburo, Keith Humble, Norman Kroll, Robert Livingston, Thomas Nee (Chairman), Pauline Oliveros, Will Ogdon, Roger Reynolds (Director), John Silber, Bertram Turetzky.

Symposium events will be recorded, and tapes are available on a limited basis to Institutions and interested persons.

## VISUALS AND VOICES: The Natural and the Synthesized

One of the major purposes of the Center for Music Experiment and Related Research is the investigation of new sources of material appropriate to the needs of musicians and to others engaged in performance art. The two-part symposium, VISUALS & VOICES is an exercise of that function.

To cover, within the confines of a two-week period, the richness of visual or vocal phenomena is, of course, thoroughly impractical. In observing the explorations of innovative artists, however, at least two striking and divergent attitudes towards materials emerge. Some are committed to fresh and unfettered approaches to the natural events that have always been a part of our surroundings but have remained outside the formalized realms of Western Art. Examples of extant but unexploited materials include the vocal practices of Tibet, Korea, Japan, India and Near-Eastern countries. Through their harmonic richness, timbric variety, and technical facility, they present a canvas of potential vastly larger than that to which we in the West are accustomed. On the visual side, naturally occurring moulds, algae, and larger forms of vegetation also fascinate with their variety and subtly evolving cycles of texture, and color. Artists involved with such naturally (one might say ecologically) cultivated commitments have generally eschewed technical apparatus in any central role.

Another group of creative persons, engaged by the analytic power of the sciences (and subsequently the potential for synthesis), have begun to use sounds created by analog equipment or directly by digital computers. These include both synthesized speech and pseudo-instrumental sounds for musical purposes. Visual artists have become involved with the computer's potential for control of graphic display, and its capacity for tirelessly generating combinations of elements within any pre-defined set of boundary conditions.

More recently, the well-known power of the filmic medium has been enlarged by the far more easily established special effects, the instant accessibility, and distribution potential of video tape. Video synthesis - analogous to the direct, electronic generation of sound materials - has opened up an entirely new field of aesthetic visual material which can remain entirely abstract, emulate natural phenomena, or combine the two in previously unimagined interactions.

In planning the present symposia, we have attempted to survey some of the boundary areas in the visual and vocal fields. We will present sometimes unfamiliar materials and, with the aid of qualified observers from the sciences, attempt to assay their generative mechanisms. This will be the case, for example, with the CME's Extended Vocal Techniques Group. With some evident exceptions, we do not propose to present definitive artistic uses of these new potential materials. The intent is quite simply to display and discuss unfamiliar phenomena, avoiding precipitous judgments about their future importance.

Roger Reynolds  
Director



Extended Vocal Techniques Group at rehearsal  
(left to right: Philip Larson, Kim Pauley, Warren Burt, Linda  
Vickerman)

Photo: Karen Reynolds

Monday, February 11, 408 MC

SEMINAR: Voice Production (Pandit Pran Nath)

1-2:30 PM

A discussion of the mechanisms of voice production in the more than 600-year old Kirana style of North Indian raga singing.

\*PROGRAM:

8:30 PM

The CME Extended Vocal Techniques Group  
(Linda Vickerman, Philip Larson, Elinor Barron, Edwin Harkins, Deborah Kavasch, Warren Burt, Melvin Warner, Martin Grusin)

A demonstration, through group improvisations, of the use of extended vocal techniques in musical contexts.

\*The general public is invited to this event.

Tuesday, February 12, 408 MC

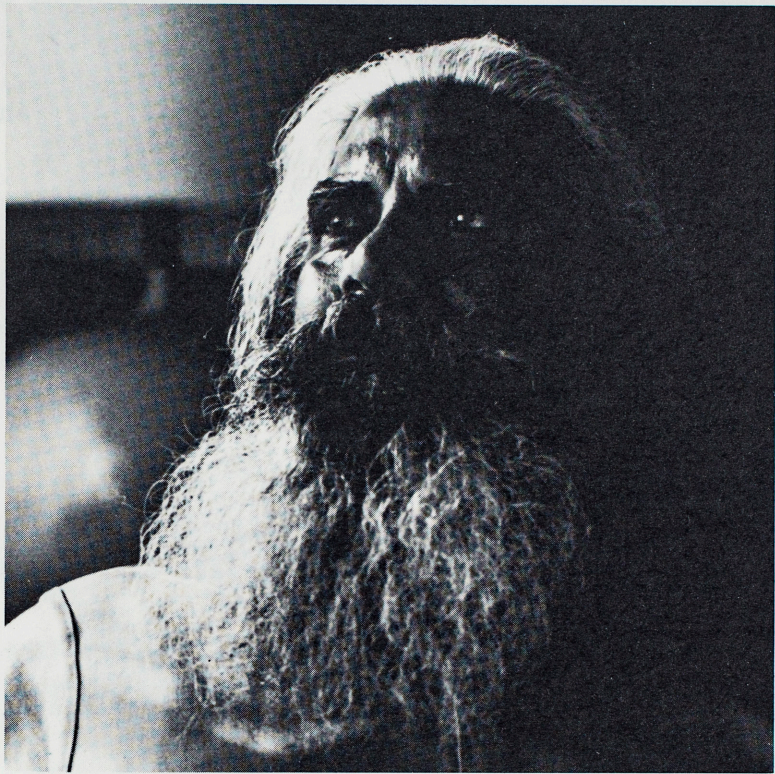
- SEMINAR: Shruti and Gammacks (Pandit Pran Nath)  
1-2:30 PM Demonstration and discussion of the microtonal subtleties and ornamental techniques of the Kirana style as applied to various categories of ragas.
- \*CONCERT: North Indian Vocal Music (Pandit Pran Nath with Terry Riley and assisting musicians)  
8:30 PM  
A concert of North Indian, Kirana style ragas.

Wednesday, February 13, 408 MC

- DEMONSTRATION: The Artificial Larynx As A Vocal Tract Stimulant, (Robert Gross & Linda Vickerman)  
1-2:30 PM  
A demonstration, both live and on tape, of what is possible through stimulating the vocal tract mechanically through the outer wall of the throat rather than using the vocal chords.
- SEMINAR: An Approach to Digital Analysis and Synthesis of Vocal Sounds (Charles Dodge)  
8:30 PM  
Presentation of taped samples of speech synthesis with subsequent explanation of the computer programming techniques involved in producing them.

\*The general public is invited to this event.





Pandit Pran Nath

Thursday, February 14, 408 MC

\*SEMINAR: Vocal Characterization: Humans, Animals  
Objects (Mel Blanc)

1:30-3:00 PM

Discussion, with appropriate Warner Bros. animated films, of Mr. Blanc's methods of voice characterization that have resulted in such memorable creations as Bugs Bunny, Speedy Gonzales and Daffy Duck.

SEMINAR: Approaches to Vocal Synthesis (Timothy S. Smith)

8:30 PM

A presentation of various approaches to electronic speech synthesis, with taped examples. Some contrasts between the aims of speech and musical synthesis will be explored.

Friday, February 15, 408 MC

WORKSHOP/  
DISCUSSION: Non-Linguistic Communications (Mel Blanc;  
Eric Christmas; Ursula Bellugi-Klima,  
with Shawny Mow and Sharon Neumann; the  
EVT Group)

3-6:00 PM

An exploration of various techniques and exercises designed to achieve communication through non-verbal means, including sign languages.

SEMINAR: Linguistic Features of the Larynx (Peter Ladefoged)

8:30 PM

Discussion of the variety of ways by means of which the human larynx adapts to the requirements of diverse languages.

\*The general public is invited to this event.



Vocal characterist, Mel Blanc

Saturday, February 16, 408 MC

WORKSHOP/  
DISCUSSION:

1-4:00 PM

A Lexicon of Extended Vocal Techniques

(Robert Galambos, Peter Ladefoged,  
Robert Livingston, Timothy S. Smith, the  
EVT Group)

A presentation of the current EVT Group  
Lexicon with comment and informal analy-  
sis by observers from linguistics,  
phonetics and neuro-sciences.

Sunday, February 17, 408 MC

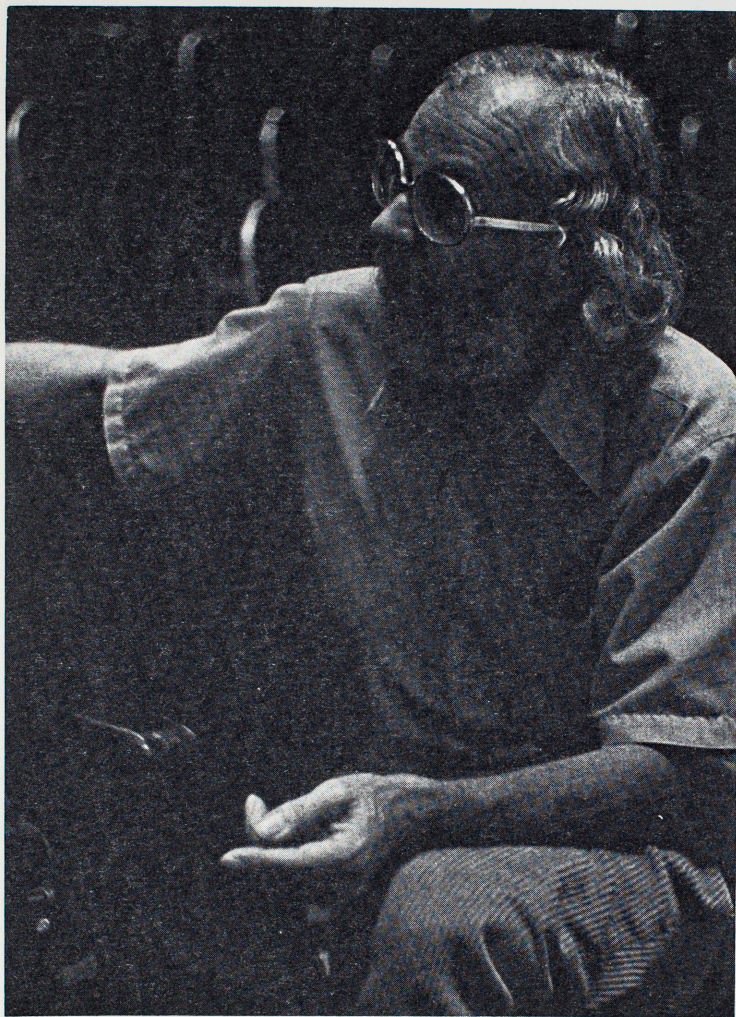


Photo: Charles Eames

John Whitney

\*SEMINAR:

1:00 PM

Automated Film Graphics:  
An Historical Overview (John  
Whitney)

A presentation of Mr.  
Whitney's work from early  
experiments with pendulums  
and gear systems through his  
present use of computer pro-  
grams and CRT output.

\*The general public is invited  
to this event.

Monday, February 18, 408 MC

PANEL: Video Synthesis and Computer Generated Graphics (Stephen Beck, Harold Cohen, Frank Gillette, John Whitney)  
1-2:30 PM

A discussion of the impact of newly developing technical devices upon the generation of visual phenomena.

SEMINAR/TOUR: Pushing Whole Systems: The Ecological Form (Newton Harrison)  
8:30 PM

An illustrated presentation of the ways in which long term visual systems inform us: a surface look giving aesthetic yeild, the long-term view an informational yeild. A tour of Mr. Harrison's reconstructed crab lagoon will follow.

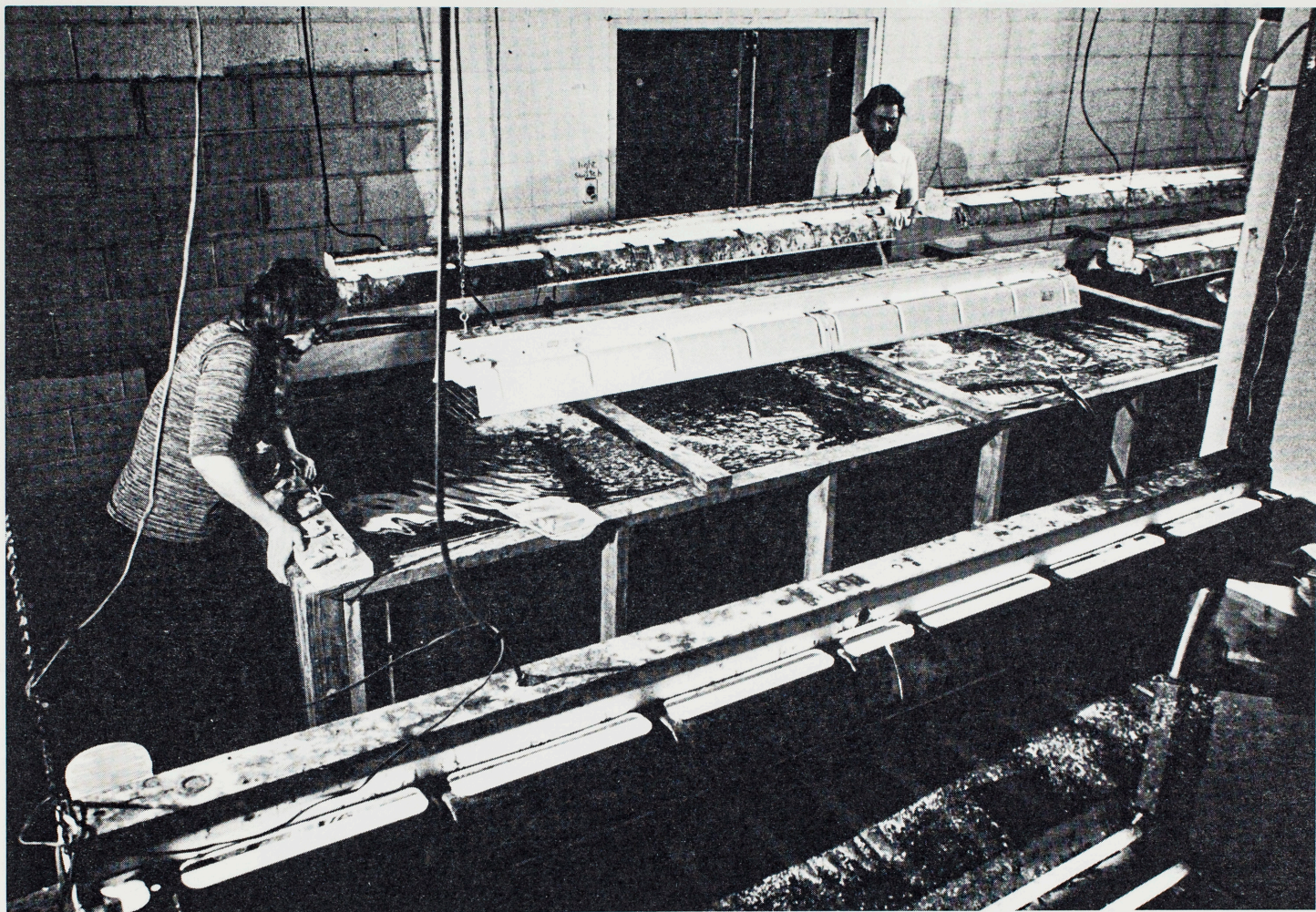
Tuesday, February 19, 408 MC

DEMONSTRATION: Elements of Video Synthesis (Stephen Beck)  
1-3:00 PM

A presentation of the Beck Direct Video Synthesizer with demonstration of its basic capacities.

SEMINAR/  
DEMONSTRATION: Cybernetic Implications of Video in the Visual Arts (Frank Gillette)  
8:30 PM

A discussion of feedback techniques applied to video, with video taped materials.



Helen Harrison and Newton Harrison tending ecological system  
Photo: Philip Steinmetz

Wednesday, February 20, 408 MC

PROGRAM: Three Pieces in a Space of Time  
(John Forkner)

1-2:30 PM

Optical physicist John Forkner will present several visual works based on optical as opposed to electronic mechanisms.

VIDEO  
PRESENTATION: "Pilobolus and Joan" (1973)  
(Ed Emshwiller)

8:30 PM

Showing of a 60-minute video work realized at WNET in New York with comment by the artist.

Thursday, February 21, 408 MC

SEMINAR: Two Short Video Works with Commentary  
(Ed Emshwiller)

12-1:30 PM

Showings of Thermogenesis (1972) and Scapemates (1972) with commentary by the maker.

PANEL: Video Concepts (Ed Emshwiller, Frank Gillette, Newton Harrison)

8:30 PM

A discussion, from diverse perspectives, of the implications of video and video tape as media.



Friday, February 22, 408 MC

\*WORKSHOP/

DEMONSTRATION: An Improvisation: Video, Audio and  
Voices (Stephen Beck, Warren Burt, the  
EVT Group)

8:30 PM

\*The general public is invited to this event.



Video artist/theorist, Frank Gillette  
Photo: David Ross

INDEX TO A RECORDED LEXICON  
OF EXTENDED VOCAL TECHNIQUES

Warren Burt, Linda Vickerman,  
Elinor Barron, Deborah Kavasch,  
Martin Grusin, Philip Larson,  
Edwin Harkins, Stan Evans

Recording Engineer: Alan Johnson  
(Tape in the CME Archive, UCSD)

I. Reinforced Harmonics

Un-nasalized: Warren Burt, chest register  
Deborah Kavasch, falsetto register  
Nasalized: Warren Burt, chest register  
Elinor Barron, falsetto register

II. Chant

Falsetto Register: Warren Burt  
Linda Vickerman  
Chest Register: Philip Larson  
Elinor Barron

III. Multiphonics

Forced Blown: All group members in sequence  
Ingressive: All group members in sequence  
Glottal overpressure: Warren Burt  
Screech: Elinor Barron

IV. Ululation

Deborah Kavasch, Martin Grusin  
Multiphonic Ululation: Elinor Barron  
Linda Vickerman

V. Oscillation

Wide Vibrato: Deborah Kavasch, falsetto register  
Philip Larson, chest register  
Yodel: Deborah Kavasch  
Warren Burt  
Harmonic oscillation: Elinor Barron

- VI. Vocal Fry  
Egressive: Edwin Harkins  
Ingressive: Philip Larson  
Ligamental Speech, Ingressive: Linda Vickerman  
Ligamental Speech, Egressive: Edwin Harkins
- VII. Fricatives  
Pharyngal: Warren Burt  
Velar (with saliva): Philip Larson  
Ingressive Dental (with lip stop): Philip Larson
- VIII. Buccal Speech  
Martin Grusin  
Digital Plosive: Martin Grusin
- IX. Clicks, Velaric Ingressive  
Palatal: Deborah Kavasch  
Dental: Elinor Barron  
Lateral: Linda Vickerman  
Bilabial: Warren Burt
- X. Glottalic Stops  
Ingressive Uvular: Philip Larson  
Egressive Bilabial: Edwin Harkins
- XI. Trill  
Ingressive bilateral (with saliva): Philip Larson  
Bilabial (with tongue closure): Edwin Harkins  
Assorted bilabial (voiced and unvoiced): Edwin Harkins  
Dental (voiced and unvoiced): Deborah Kavasch  
Uvular (voiced and unvoiced): Linda Vickerman  
Digito-bilabial: Elinor Barron  
Cheek: Edwin Harkins  
Lingual Labial: Edwin Harkins  
Manual Buccal: Warren Burt  
Esophagal: Warren Burt
- XII. Miscellaneous  
Whistle, voiced: Warren Burt  
Tongue squish (with saliva): Deborah Kavasch  
Tongue-teeth Slap: Edwin Harkins

Stephen Beck, Electronic Videographer at the National Center for Experiments in Television, San Francisco, is the inventor of the Beck Direct Video Synthesizer. He has been the recipient of grants from the National Endowment for the Arts and the American Film Institute.

Ursula Bellugi-Klima, Member of the Salk Institute, is the author of numerous articles on language acquisition. Her most recent area of research is in the comparison of sign language and spoken language.

Mel Blanc is widely known as the creator of many "voice characters," such as Porky Pig, Woody Wood Pecker, Tweety and Bugs Bunny. His vocal characterizations have dominated radio, motion pictures, and television for the last forty years.

Eric Christmas, Professor of Drama and Director of the UCSD Theater, has wide experience as an actor, and director. He has appeared in many television dramas, in motion pictures, and as a director at the Old Globe Shakespeare Festival.

Harold Cohen, Professor of Visual Arts, UCSD, enjoys a wide reputation as a painter, both in Europe and America. His current interest is in the process of Machine-Generated Images.

Charles Dodge, composer, is on the Music Faculty at Columbia University. His work is recorded on the CRI and Nonesuch labels. Of particular interest is his recent work in voice and song synthesis.

Ed Emshwiller, filmmaker and video artist, is interested in a choreographic approach to film. He feels his films as musical or poetic works, but his principle interest at present is in the image making and transforming capabilities of video tape.

John Forkner, optical-physicist, is a consulting engineer for the Philco corporation, and has been active in the EAT (Experiments in Art and Technology) organization. His recent work involves the use of optics in creative environmental control.

Robert Galambos, auditory neuro-physicist, is a professor of Neuro-Sciences at UCSD. His research interests include human brain waves and evoked auditory responses.

Frank Gillette, video artist, was a founder of the "Raindance" group in New York. His recent work is involved with sculptural disposition of video monitors, associated with live closed circuit transmission and time delay systems.

Newton Harrison, artist, is chairman of the Visual Arts Department, UCSD. His recent interest in "visual signal systems" involves long-term and short-term observation of controlled ecological systems - color and texture changes as a way of understanding ecological processes.

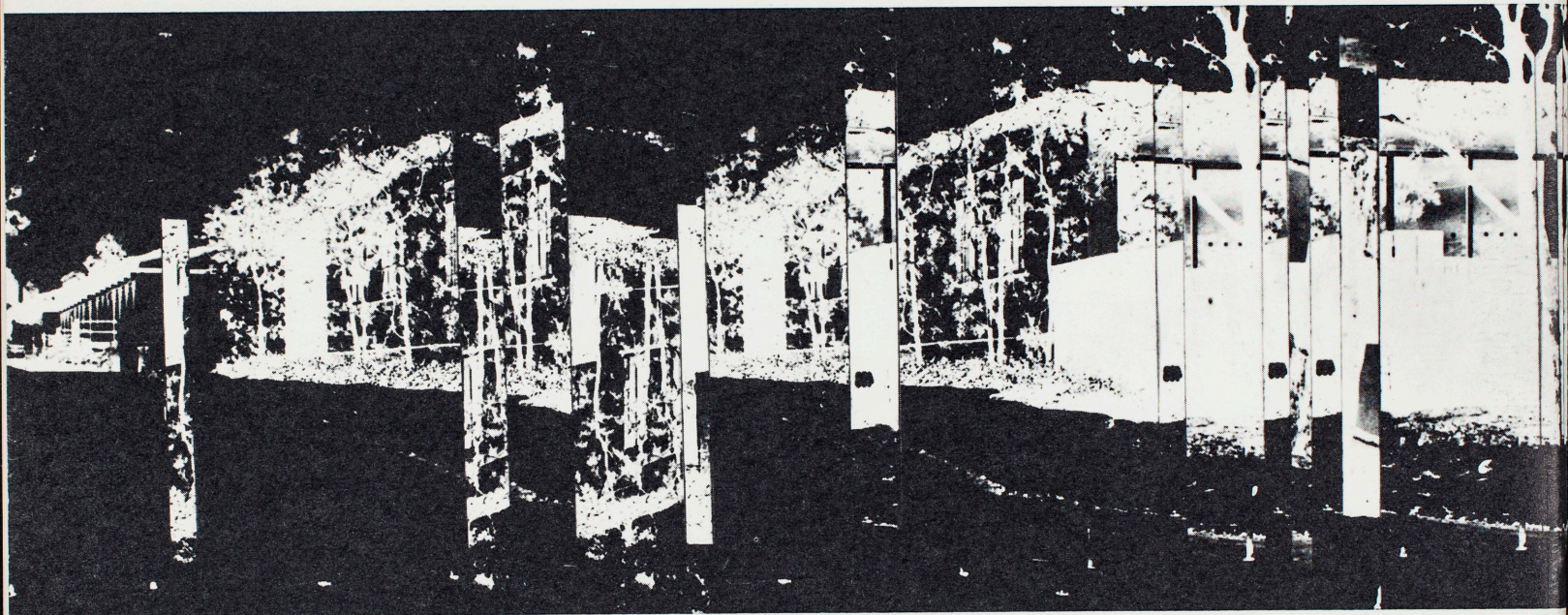
Peter Ladefoged, phonetician, is a Professor of Phonetics and founder of the experimental phonetics laboratory at UCLA. His current research is mainly concerned with the investigation of physiological parameters for characterizing speech, and aspects of linguistic phonetics.

Pandit Pran Nath, master of the Kirana style of North Indian raga singing, is the disciple of the late Ustad Abdul Waheed Khansahib. He has sung for audiences throughout the world.

Terry Riley, composer, is associated with Mills College. His widely influential music has been recorded and broadcast both in the U.S. Europe. He has most recently been actively touring with, and accompanying Pandit Pran Nath.

Timothy S. Smith, phonetician, is Assistant Professor of Linguistics, UCSD. His research interests lie in the areas of neuro-linguistics and experimental phonetics.

Shawny Mow and Sharon Neumann are researchers in the study of Sign Languages at the Salk Institute, La Jolla.



SYMPOSIUM: January 10 - 12, 1975


# THE SERIAL CONCEPT AND SCHOENBERG



**CENTER FOR MUSIC EXPERIMENT**

University of California at San Diego

La Jolla, California 92037

 center  
for  
music  
experiment:

The Center for Music Experiment and Related Research was initiated in 1972 by the Department of Music at UCSD with the aid of a \$400,000 grant from the Rockefeller Foundation. In addition, support from the University of California and the Ford Foundation has made its continued development possible. Each year the CME hosts resident UCSD Faculty, Visiting Research Personnel, and at least one conference. In past years, these have included "Voices and Visuals," "Psychoacoustics and Perception," and "Computer Programming and Music." CME Fellows, in addition to aiding senior research residents, carry on their own explorative work. Some of these efforts will be represented on one program of the present Symposium.

Serialism has had a substantial impact on musical practice in this century. This Symposium is designed to explore the compositional origins of the concept and to discuss the nature of its implications as an organizational principle. The symposium is seen as an opportunity to ask a few new and perhaps stimulating questions.

- Roger Reynolds  
Symposium Director

#### Symposium Guest Participants:

MILTON BABBITT, educated at New York University and Princeton, also studied with Roger Sessions. He has taught at the Berkshire Music School, Darmstadt, the Juilliard School, and is now William Shubae Conant Professor at Princeton.

Known as a composer in a variety of forms and media, including orchestral and electronic works, Mr. Babbitt is also a widely published theorist on serial procedures and their extensions. Recorded compositions such as Philomel, Ensembles for Synthesizer, and the String Quartet No. 3 are augmented by his technical writings in such publications as Perspectives of New Music, The Journal of Music Theory, and the Journal of the American Musicological Society.

ALLEN FORTE was born in Portland Oregon and educated at Columbia University. He has taught at the Mannes College of Music, Columbia Teachers College, Massachusetts Institute of Technology, and Yale University. At present, he is Professor of the Theory of Music at Yale, and Director of Graduate Studies for the Department of Music.

Mr. Forte is best known for his work related to the theories of Heinrich Schenker, for his studies in computer-implemented analysis of music, and for his research in structural aspects of atonal music. His published writings include Contemporary Tone-Structures (1955), The Compositional Matrix (1961, republished 1974), Tonal Harmony in Concept and Practice (1962, 1974), The Structure of Atonal Music (1973), and many articles.

LEONARD STEIN was assistant to Schoenberg from 1939 until the composer's death in 1951. During this period, he edited books by Schoenberg on harmony, counterpoint and composition as well as aiding in the preparation of lectures and articles. He has just compiled and edited a new edition of Style and Idea, and is co-editor of the Complete Edition of Schoenberg's Musical Works being published in Europe.

Mr. Stein has been active as a pianist, conductor and organizer of modern music programs including those of the Monday Evening Concerts, the Encounter Series, and Theatre Vanguard in Los Angeles. He now teaches at the California Institute of the Arts, specializing in analysis and performance of 20th century music.



SYMPOSIUM: THE SERIAL CONCEPT AND SCHOENBERG

Friday, January 10

2:30 - 5:30 "Schoenberg's Compositional Procedures in the Atonal Music Prior to the Development of the 12-tone Method"  
Allen Forte (Yale University)

8:00 - 10:00 "Schoenberg's Writings on 12-tone Composition"  
Leonard Stein (California Institute of the Arts)

Saturday, January 11

10:00 Presentation by Center Personnel: "The Hybrid IV Computer System" (Edward Kobrin, CME Technical Director); SHOW AND TELLI, Compositions for Video: a. Give and Take, b. Minim-Tellig 1, 2, 3 (Kenneth Gaburo and the NMCE IV); A Demonstration by the CME Extended Vocal Techniques Group

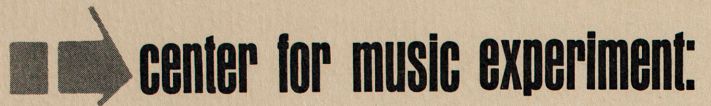
2:00 - 5:00 "Since Schoenberg"  
Milton Babbitt (Princeton University)

Sunday, January 12

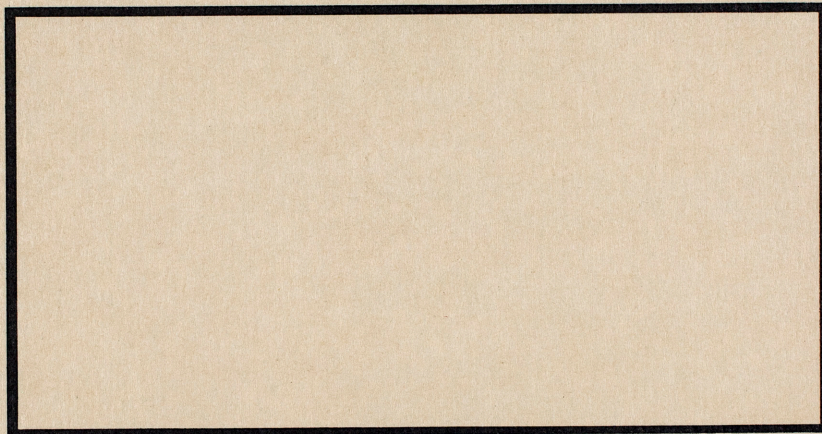
10:00 "Schoenberg's 12-tone Sketches"  
Leonard Stein

2:00 - 5:00 PANEL DISCUSSION: "Serialism as Concept"  
Milton Babbitt, Allen Forte, Leonard Stein

Time is planned for questions from the floor and open discussion after each presentation. All events are held at the Center for Music Experiment, 408 Matthews Campus, UCSD. The Symposium is free of charge and open to the public.

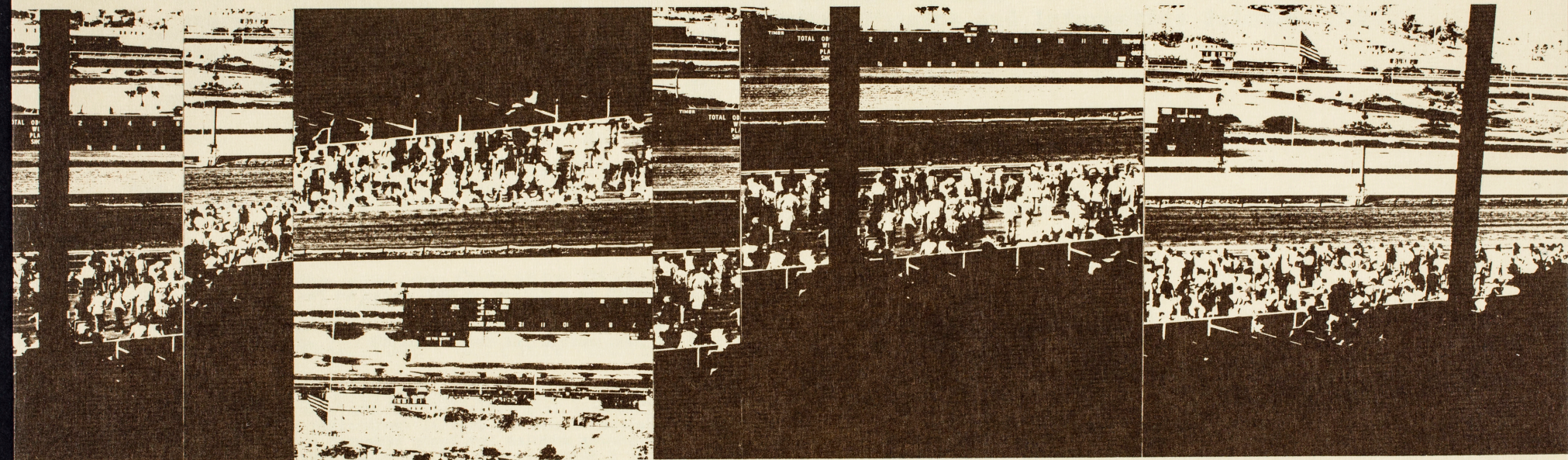


University of California at San Diego  
La Jolla, California 92037  
714/452 4383



CONFERENCE: April 12, 1975

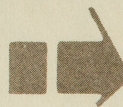
# MUSICAL APPLICATIONS OF DIGITAL SIGNAL PROCESSING



**CENTER FOR MUSIC EXPERIMENT**

University of California at San Diego

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experiment:**

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The role of digital synthesizers is becoming more important in electronic music, with the rapid advance of digital signal processing techniques. This conference presents discussions of some of these systems and the techniques used to implement them.

Conference Participants:

DR. STANLEY WHITE is currently Group Leader in the Electronics Research Division of Rockwell International, where he is working on linear predictive coding and digital filter mechanization. He has taught at UCLA, UC Irvine, and at Purdue Univ.

FREDRIC HARRIS is presently a consultant for the Naval Undersea Center and the University of California in the field of digital signal processing. He is also an Associate Professor in the School of Engineering at San Diego State University.

PETER SAMSON is Project Engineer for the Systems Concepts Digital Synthesizer. He has been working with real time digital synthesis since 1959 when he developed a timbre generating system on the TX-0 Computer at MIT. Later at MIT he worked on the development of MAC, an interactive software implemented digital synthesizer which generated a conventional score output.

ROBERT GROSS is Technical Supervisor for CME, where he is designing an interactive digital synthesizer. In 1971-72 he worked on a computer controlled analog synthesizer at the Polytechnic Institute of Brooklyn.

BRUCE LEIBIG is a Fellow at CME, where he has developed a software implemented digital synthesis system to run on a PDP 11. He is also software designer for the CME's digital synthesizer and was responsible for installing MUSIC V at UCSD.

BRUCE RITTENBACH is a Fellow at CME, where he is participating in the design of the CME digital synthesizer. He has also designed analog modules for Sonic Research Associates. He is in the Master's degree program of the Music Department at UCSD.

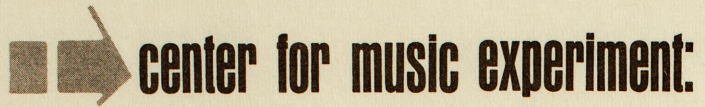
WADE CHANDLER is a senior in the Department of Applied Physics and Information Science at UCSD where he is working on the development of a real time digital synthesizer.

CONFERENCE: MUSICAL APPLICATIONS OF DIGITAL SIGNAL PROCESSING

Saturday, April 12, 1975

- 2:30 "The CME Digital Music Synthesizer"  
Robert Gross, Bruce Leibig, Bruce Rittenbach (Center for Music Experiment)
- 3:00 "A Timbre Tuning Digital Synthesis System"  
Bruce Leibig (Center for Music Experiment)
- 3:30 "A Real-Time Digital Additive Synthesis Music System"  
Wade Chandler (Department of Applied Physics and Information Science, UCSD)
- 3:50 Demonstration of CME Systems  
Center for Music Experiment Staff
- 4:15 "Noise Performance of Hardware and Software Implemented Digital Filters"  
Fredric Harris (San Diego State University)
- 5:00 "Digital Tone Generation and the Mechanization of Digital Filters for Formant Filtering"  
Stanley White (Rockwell International)
- 7:30 "The Systems Concepts Digital Synthesizer"  
Peter Samson (Systems Concepts)
- 8:30 Discussion: Software Control of Digital Music Systems
- 9:00 Concert/Demonstration: Taped Compositions and Experiments Using Digital Music Systems

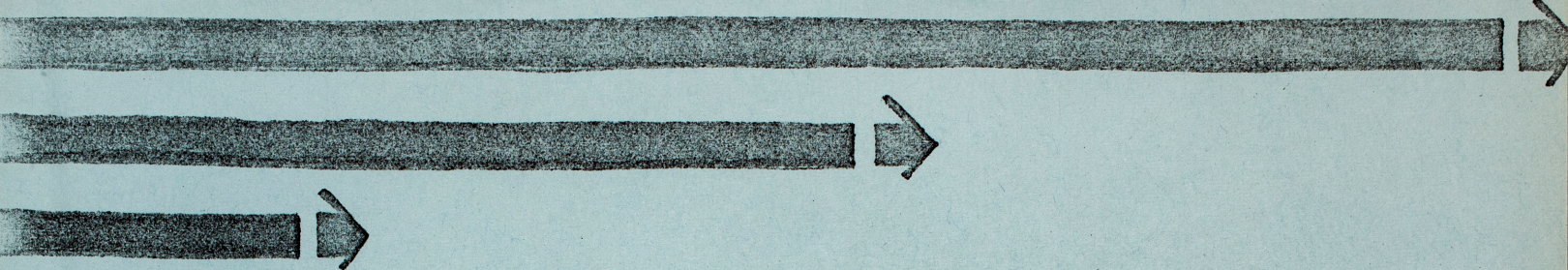
This event is held at the Center for Music Experiment 408 Matthews Campus, UCSD  
The Conference is free of charge and open to the public.



**center for music experiment:**

University of California at San Diego  
La Jolla, California 92037  
714/452 4383

*Professor Hevins  
B-026*



PHYSICAL PROPERTIES OF POLARIZED LIGHT

William Swindell

University of Arizona

Optical Lab

April 14, 1976

Noon

Center for Music Experiment

408 mc