

PROPOSAL ROUTING FORM

(FOR EXTERNALLY SPONSORED PROJECT)

IS THIS FORM COMPLETED

January 82

2. CHECK ONE:

AGENCY REQUIRED DATE

() PROPOSAL MUST BE MAILED BY:

(X) PROPOSAL DUE AT AGENCY BY: 15 Jan 82

NAME

4. TITLE

5. % EFFORT

6. ADMINISTERING DEPARTMENT

7. DEPT. ADMINISTRATIVE CONTACT(S) & OFFICE & HOME PHONES

in Chowning, Professor

CCRMA
Music Dept.

Patte Wood 74971
493-2531

PROPOSAL TITLE

Request for support of ongoing work
Center for Computer Research in
Music and Acoustics - early funding

9. PROPOSAL PERIOD

From January 1982 To

10. PROPOSAL AMOUNT
1st Year 2nd Year Total
\$ 304,896 \$ \$

MAIL PROPOSAL TO (agency name and address)

System Development Foundation
81 Lytton, Suite 210
Palo Alto, CA 94301

13. RFP/RFQ/GRANT/CONTRACT/DEPARTMENT IDENTIFICATION NO.

14. () SPO TO MAIL

(X) DEPARTMENT TO PICK UP

BY (NAME): see below

15. NUMBER OF COPIES
a. Requested by agency b. To be mailed to agency

1

1

1

16. NO. OF COPIES TO BE SIGNED

ATTENTION OR REFERENCE (name, title, room, code numbers, etc.)

Charles Smith

OTHER AGENCIES TO WHICH THIS PROPOSAL SUBMITTED & DATE SUBMITTED (A separate SU-42 form is required for each submission)

17. CHECK ONE PER COLUMN (If 'Other', specify)

() Research () Contract (X) New () Revised budget
() Instruction (X) Grant () Renewal () Revised proposal
() Equip. only () Fellowship () Supplement () Other
(X) Other () RFP/RFQ () PHS previously recommended year
general support () Other () PHS competing renewal
() Other

CHECK ALL ITEMS

YES NO

Are human subjects involved?

() (X)

Are () biohazards or () Recombinant-DNA involved? () (X)

(For list of substances, see SPO Handbook)

Are radiological hazards involved?

() (X)

Are laboratory animals involved?

() (X)

Is acquisition of computer equipment or

external computing service involved?

(X) ()

Is new construction or building renovation proposed?

() (X)

Will research, instruction or conference space

be required?

() (X)

Is travel involved?

() (X)

18b. If yes, date Request for Review sent to panel
Date approved

19b. If yes, date protocol filed.

Date approved

MUA No.:

20b. If yes, date protocol filed.

Date approved

21b. If yes, attach Animal Care Information form.

22b. If yes, date approved copy sent 1/12/82

23b. If yes, date approved

24b. () SU existing space () VA or rented space () Other

(Space plan on page _____ of proposal. If not included, attach explanation.)

25b. If yes, please check all applicable: () domestic

(Include in budget justification) () foreign

Institutional Cost Sharing, as required by statute (attach cost-sharing worksheet, if applicable) TOTAL AMOUNT \$

PER- CENT: %

Faculty Effort Total Salary Dollar Recovery

ACADEMIC YEAR: \$

SUMMER: \$

OR CALENDAR YEAR: \$

Are Principal Investigators eligible? (If no, attach waiver approval or waiver request. Request should be submitted in memo form by Department Chairman and Dean to Vice-Provost and Dean of Research)

YES NO
(X) ()

Are current indirect-cost rates used? (If no, attach waiver approval or waiver request. Request should be submitted in memo form by Department Chairman and Dean to Vice-Provost and Dean of Research.)

() (X)

Have Patent Agreements (SU-18) been signed by all participating research and technical personnel? (All individuals who are, or expect to be, participating in externally sponsored project agreements with patent terms are required to sign the Stanford Patent Agreement)

(n/a) ()

Is proposal based on proprietary information, privately owned technology, inventions, patents, or data - yours or others?

() (X)

Is equipment over \$200 each proposed? (If yes, identify each item in budget and include in budget justification)

(X) ()

Is there student involvement? (If yes, identify where student involvement is explained in proposal and budget, on pages _____ and _____)

(X) ()

If no, include justification.

REQUIRED SIGNATURES:

PRINCIPAL INVESTIGATOR

CHAIRMAN OR DIRECTORS

DEANS

VICE-PROVOST & DEAN OF RESEARCH

REMARKS:

This proposal to be coordinated with Henry Organ in the Development Office.

John M. Chowning, Director
Center for Computer Research
in Music and Acoustics (CCRMA)
Department of Music
Stanford University
Stanford, California 94305

November 23, 1981

System Development Foundation
181 Lytton, Suite 210
Palo Alto, California 94301

Request for Support for Ongoing Work at the Stanford University
Center for Computer Research in Music and Acoustics (CCRMA)

Emergency Funding Request \$304,896
Facility Support \$ 95,896
Hardware Support \$209,000

Background

Through extensive application of computers in the generation and processing of sound and the composition of music from levels of the micro-formal to the macro-formal, composers, from creative necessity, have provoked a robust interdependency between domains of scientific and musical thought. Not only have science and technology enriched contemporary music, but the converse is also true: problems of particular musical importance often suggest or pose directly problems of scientific interest, as well. Each having their own motivations, music and science interdepend and in so doing define a unique relationship to their mutual benefit. It is in this spirit that CCRMA has evolved over nearly twenty years to become a national and international resource for research and composition. The scope of the scientific-musical interaction at CCRMA is reflected in the current population of ca. 40 active users distributed more or less equally between music (composition and musicology) and science (engineering, speech and hearing, computer science, and psychology). Experience has shown that the size of the user population at CCRMA is nearly optimum for the nature of the research and musical activities being pursued: it is small enough that intra-laboratory communication is easy, yet large enough to provide for a broad variety of interests and expertise. It is, therefore, the purpose of this proposal to define the funding needed to optimize the staffing and operation of the supporting facility and to develop the computational environment to include the new technology and its attendant concepts.

It is generally agreed that personal computers linked together through networks is one of the more attractive recent developments in computer systems. It is also agreed that maintaining as part of the network a large computer with large storage capacity is desirable for computational tasks inappropriate to small computers and for file storage and archiving.

As the Computer Science Department at Stanford is connecting its large computers via Ethernet and developing the Motorola 68,000 based Sun personal computing stations, CCRMA would benefit greatly by following the same direction. We propose then to upgrade our current large computer system to meet current computational needs and create our own local Ethernet which will have a 'gateway' to the other campus networks. In addition to the known qualities of the Sun terminal of powerful graphics and computation, the Sun station is particularly attractive to CCRMA in two ways: (1) it is based in the C language and UNIX system which is the principle language at both UCSD and MIT (in addition to many other computer music groups) facilitating inter-laboratory communication, and (2) it is a modular architecture based on a standardized bus and card which allows peripherals and specialized inter-faces to be connected with very great ease.

Interfaces for psychoacoustic and music research-

The Sun architecture provides an ideal environment for the development of specialized man-machine interfaces to control synthesizer-processor modules. Any one Sun station can be modified, debugged, etc. without effecting the rest of the system. We plan to develop an "interaction console" which will have provision for a number of input devices such as clavier keyboard, knobs, tablet, and more specialized interfaces to, for example, capture performance gestures of high-dimensional activity such as violin performance. Psychoacoustic research can make extensive use of such devices in interactive experiments as well as music research and composition.

The consideration of LISP machines is based on the fact that CCRMA is currently engaged in a research project of a predominantly A.I. nature, the segmentation-segregation of polyphonic acoustical signals where music manuscript is the output. This effort involves a great deal of signal processing which is 'informed' from higher levels. We believe that a LISP machine on the Ethernet with an array processor is the preferred environment for such research.

Request for early funding:

I indicate here with ** (totaled in right-most column) those budget items which I request the foundation to consider for funding beginning in January 1982. The total requested for early funding is \$304,896 which is to be used to:

1. order a high-speed processor and memory and have operational by June 1'
2. up-grade the real-time digital synthesizer-processor,
3. support personnel who are critical to the development of the system, and
4. meet some of the on-going operating expenses.

The high-speed processor is of critical importance to the research and composition being pursued at CCRMA as the current processor is not sufficiently fast to meet our computational demand. Funding for key personnel and operating expenses must in any case be found. Therefore, early funding will allow a much needed upgrade of the computer system and allow me to divert time from fund raising to my own research and composition.

Budget

- I. Facility Support (1982-1985 at 10% increase per year - CCRMA has a license agreement with a major manufacturer of electronic instruments. Royalty income will increase over the next five or six years such that CCRMA will be able to become self-supporting).

Total Funding Request Early Fundin Request

1982

A. Permanent Staff

1. hardware engineer (to be appointed)
2. audio technician (to be appointed)
3. system programmer, John Mock
4. administrative asst, Patte Wood, 50%
5. secretary (to be appointed)
6. Senior Res. Assoc., Loren Rush, 75%

salary

benefits (19.3%)

total

B. Temporary Staff

1. research assistants (2 @ 6,000)
2. post-doctoral research (2 @ 22,000)
3. guest composers & researchers (2 @ 35k)

\$ 12,000

44,000

70,000

\$126,000

benefits (19.3%)

24,000

total

\$150,000

C. Expendables

1. hardware maintenance contracts
2. computer and audio supplies
3. communication
4. misc.
5. campus ethernet connection

\$15,000

5,000 ** 5,000

3,500 ** 3,500

2,000 ** 2,000

4,000

total

\$29,000 ** \$10,000

TOTAL FOR 1982

\$347,000 ** \$95,896

With 10% increase per year

TOTAL FOR 1983

\$382,000

" 1984

\$420,000

" 1985

\$462,000

TOTAL FACILITY SUPPORT

\$1,611,000

REQUESTED FOR EARLY FUNDING

** \$95,896

II. Hardware (one time costs)

	Total Funding Request	Early Funding Request
A. Upgrading of the Current Computing System		
1. Upgrade Foonly F2 to F4 processor with 2 megawords memory and cache memory	\$160,000	***\$160,000 <i>104,000</i>
2. Additional 670 mbyte disk drive	25,000	
3. 10 additional disk packs	12,000	
4. Additional tape drive and controller	10,000	
5. Upgrade Grinnel display system 1 512 board and	2,500	** 2,500 <i>2130.1</i>
6. Video switch	8,500	
7. 12 additional display terminals	11,000	** 3,500 <i>5846.5</i>
8. Upgrade SC digital synthesizer-processor	30,000	** 30,000 <i>19,040</i>
9. Precision printer-plotter for music mss.	44,000	
total	\$302,000	***\$196,000
B. Additional computing equipment necessary in order to extend research capabilities to meet the current standards.		
1. 10 Sun Work Stations	\$ 60,000	
2. Ethernet interface to F4 processor	15,000	
3. Lisp machine system (2 processors, array processor)	140,000	
4. Development of specialized interfaces and modular synthesizer-processor	ca. 100,000	
total	\$315,000	
C. Upgrading of the Audio Recording and Monitoring System		
1. Upgrade digital conversion system (ADCs and DACs with audio switch)	\$ 20,000	
2. Digital mastering tape recorder	20,000	
3. Develop 16-channel digital mixing board	25,000	
4. 24-channel analog mixing board	30,000	
5. 4 studio tape recorders	38,000	
6. 10 additional audio stations	27,000	
total	\$160,000	
TOTAL	\$777,000	***\$196,000
%6.5 sales tax	\$ 51,400	***\$ 12,740
TOTAL HARDWARE COSTS REQUESTED FOR EARLY FUNDING	\$838,400	***\$209,000

129,016.85
66,983.15

III. SUMMARY

	Total Funding Request	Early Fundin Request
TOTAL FACILITY SUPPORT	\$1,611,000	***\$ 95,896
TOTAL HARDWARE COSTS	\$ 838,000	***\$209,000
TOTAL PROPOSED PROJECT COSTS	\$2,449,000	
TOTAL REQUESTED FOR EARLY FUNDING		***\$304,896