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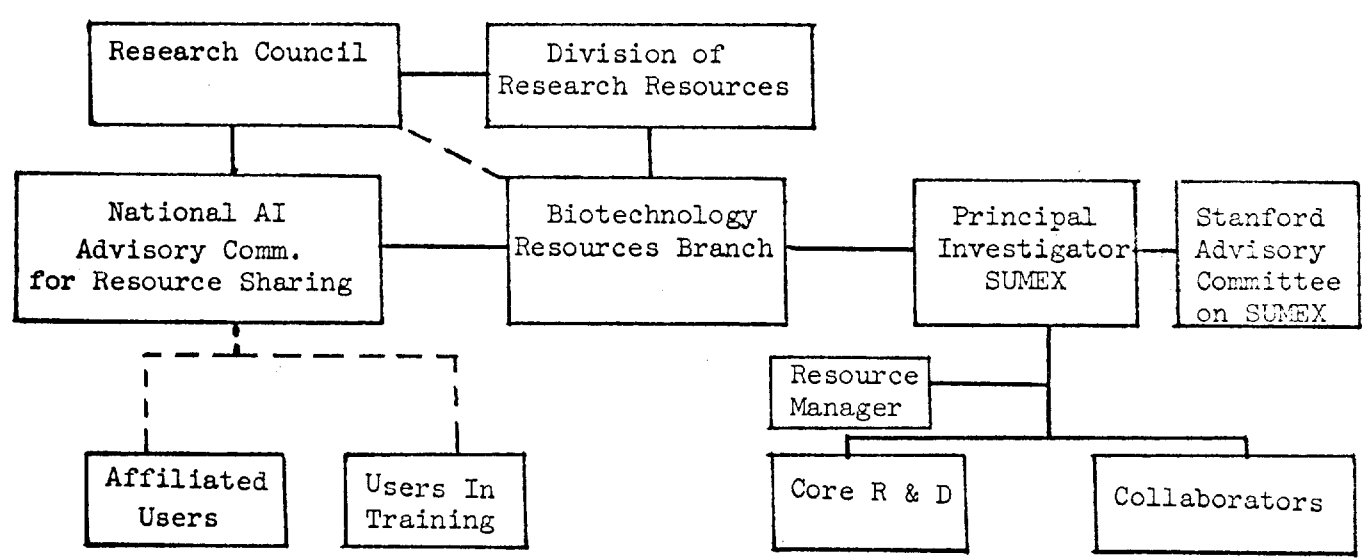
D R A F T

Proposed Management Structure for SUMEX

The proposed SUMEX resource is defined as a PDP-10 computing facility coupled with a highly trained technical staff with considerable experience in artificial intelligence applications and high data rate realtime control functions in a research environment. This research would be shared among four distinct groups: core research and development, collaborators, affiliated users, and users in training. The resource would be located at Stanford University. Resource allocation among the four groups identified above would be handled by the Biotechnology Resources Branch (BRB) of the NIH with certain constraints negotiated between BRB and the grantee at the time of resource formation. These negotiation would provide guaranteed minimum percentages of the resource to be available for the core research and development and collaborator groups. Resource allocation to various users within a single group would be handled by the mechanisms depicted in Figure I below. The core research and development group as well as the collaborating groups would receive suballocations of resources from the Principal Investigator. The affiliated users and users in training would receive suballocations from the National Advisory Committee reporting to the NIH research council serving the Division of Research Resources (DRR). The Principal Investigator would be advised by a Stanford Advisory Committee representing the interests of the core R & D and collaborator groups.

Figure I

Proposed Structure for Management and Allocation of SUMEX Shared Resource



to make changes...
avoid...

The new National Advisory Committee for resource sharing among NIH-sponsored artificial intelligence research projects would report to the DRR Research Council. Subject to the desires of the Council, we would propose that the Committee be charged with the responsibility of reviewing requests for use of the shared resource, proposing service changes to the resource, providing limited funds for user travel plus seminars and conferences, and determining the effectiveness of providing and using a shared resource of this type. The committee might be comprised of representatives of the computer study section, artificial intelligence oriented computer scientists, medical personnel in areas which may be impacted by the artificial intelligence research, the Resource Manager or his delegate, and someone interested in measuring the effectiveness of shared resources. In addition, of course, there would be staff representation from the Biotechnology Resources Branch. The role of the Council would be to determine the program relevance of resource sharing.

The Principal Investigator would appoint a Resource Manager. One function of the manager would be to provide adequate communication with the resource users concerning the services available on the resource. Users must be expected to provide their own programming. The resource programmers would consist of systems programmers; applications or scientific programmers would be expected to have their home bases identified with the user group.

One function of the National Advisory Committee and the Stanford Advisory Committee would be to establish the criteria for accepting or rejecting user applications, to set the long-range policies which would limit facility access to those groups needing the support of this particular resource. Care must be taken to avoid saturation of the resource due to attempts to serve too broad a community of users lacking a common interest or knowledge base.

SUMEX ADMINISTRATIVE ORGANIZATION

*****DRAFT*****

INTRODUCTION

The SUMEX resource operates in pursuit of two major goals and its administrative structure reflects the needs of the distinct user groups. Each user group comprises a number of people with diverse interests about the central themes. In order to assure a deliberate application of SUMEX resources in support of these various projects, an advisory committee approach is proposed as shown schematically in Figure 1.

The first goal, focussing on biomolecular characterization methodologies and applications, is based on research done at Stanford and makes specimen analysis services available to a medical user community recruited under Stanford auspices. We propose a Stanford University Biomolecular Characterization Advisory Committee to assist with the problems of administering this aspect of the resource.

The second goal, focussing on a national resource for advancing applications of artificial intelligence (AI) in medicine, makes available to a national community of users the experience of the group at Stanford pursuing such problems as well as a sizable fraction of the resources of the SUMEX computing facility. This facility will be organized and configured to support AI research in connection with the core research project and therefore these are complementary uses of the facility. Because of the distinctive national character of this second resource function, we propose an NIH AI Resource Advisory Committee to assist with its administration.

Coordination between the two groups is achieved in several ways including a) the dual membership of a designee of each committee on the other, b) the representation of the Biotechnology Research Resources Branch (BRRB) on both committees, and c) the membership of the Principal Investigator and the Facility Director on both committees.

STANFORD UNIVERSITY BIOMOLECULAR CHARACTERIZATION ADVISORY COMMITTEE (SUBCAC)

The Stanford University Biomolecular Characterization Advisory Committee (SUBCAC) is responsible to the Principal Investigator. Membership on the

committee comprises the Principal Investigator, the Facility Director, a representative of each affiliated collaborator and user group, public members (?), and observing members from the NIH AI Resource Advisory Committee, the Biomathematics and Computer Resources Study Section, and BRRB. Collaborator and user group members are the respective Investigators of the projects as accepted for use of SUMEX by committee action. Public members are appointed by BRRB and observing members by the respective organizations represented.

The function of SUBCAC is to advise the Principal Investigator in the development and application of SUMEX as a Biomolecular Characterization Resource. Specifically the committee will:

- a) Establish policies for administering the Biomolecular Characterization aspects of the resource.
- b) Suggest new medical arenas for the application of biomolecular characterization methodologies and for which SUMEX is an appropriate vehicle.
- c) Review progress and ~~assign~~ ^{recommend} priorities for allocating SUMEX resources for system development and the support of on-going collaborative projects.
- d) Review and ~~establish~~ ^{recommend} priorities for allocation ^{of} available resources to proposed new applications of the SUMEX biomolecular characterization resource.
- e) Review and negotiate with NAIRAC conflicts in system development or user support priorities brought about by limitations in SUMEX resources.
- f) Assist in the generation and review of necessary reports, renewal proposals, etc. pertaining to the biomolecular characterization aspect of the SUMEX resource.

This group will meet approximately every 3 months and will document the results of its meetings. Responsibility for implementing SUBCAC recommendations lies with the Principal Investigator. Feasibility studies for new projects

will be undertaken with the advice of the advisory committee and will be documented as appropriate, but at least annually in the facility report to BRRB. Expenses other than those of observing members are covered within the proposed SUMEX budget.

NIH AI RESOURCE ADVISORY COMMITTEE (NAIRAC)

The NIH AI Resource Advisory Committee (NAIRAC) is established by and is responsible to the National Research Resources Council. The Biotechnology Research Resources Branch (BRRB) of the NIH Division of Research Resources (DRR) acts to administer the Council's interests in establishing NAIRAC. Membership on the committee comprises representatives of the Research Council, the Study Section, DRR, BRRB, the Principal Investigator, the Facility Director, a representative from each affiliated user group, and public members representing appropriate discipline specialities. The user group representatives are the respective project Investigators accepted for SUMEX utilization by committee action. Other members representing interested organizations are appointed by the organization with the concurrence of the Council.

The function of NAIRAC is to advise the Research Council and the Principal Investigator in the use of SUMEX to support the application of artificial intelligence techniques to problems in medicine. Specifically the committee will:

- a) Establish policies for administering the artificial intelligence resource aspects of SUMEX.
- b) Suggest new medical problem areas potentially benefitting from the application of artificial intelligence techniques *and for which SUMEX is an appropriate vehicle*
- c) Review progress and ~~assign~~ ^{recommend} priorities for allocation SUMEX resources for system development and user support in AI applications on-going.
- d) Review and ~~assign~~ ^{recommend} priorities for allocating available SUMEX and discretionary BRRB resources to feasibility studies and new applications of artificial intelligence using the SUMEX facility.

- e) Review and negotiate with SUBCAC conflicts in system development or user support priorities brought about by limitations in SUMEX resources.

This committee will meet approximately every 3 months and will document the results of its meetings. Being established by the Research Resources Council, and having access to discretionary BRRB resources (see below), the responsibility for implementing NAIRAC recommendations lies jointly with BRRB and the Principal Investigator. Expenses related to NAIRAC meetings are budgeted separately from SUMEX and will be administered by BRRB. A source of discretionary funds (\$250K) will be established within BRRB to facilitate implementing NAIRAC recommendations. These funds are independent of the SUMEX budget and control and allow support of feasibility or pilot studies as well as hook-up costs, operating costs, etc. for research groups pursuing NAIRAC-approved projects utilizing the SUMEX computer and/or the existing personnel expertise at Stanford in medical applications of AI but requiring supplementary funding.

OPERATING PROCEDURES

The SUMEX facility will be operated in accord with the negotiated priorities defined by SUBCAC and NAIRAC respectively for the biomolecular characterization and AI applications aspects of the SUMEX resource. It will be the Facility Director's responsibility to implement appropriate coordination and control mechanisms for day to day resource scheduling and use. These procedures (including algorithms for machine scheduling and resource allocation) will be documented for user information and reviewed regularly with the two advisory groups to maintain an accurate reflection of administrative policies.

Conflicts arising of short duration (\lesssim one month) will be resolved among the parties involved by the Principal Investigator and the Facility Director. Conflicts of intermediate duration (\lesssim three months) will be resolved among the parties involved jointly by the Principal Investigator, the Facility Director and the dual members of SUBCAC and NAIRAC (members having appointments on both committees). Longer term conflicts (\gtrsim three months) will be resolved by negotiation between the advisory committees.

SERVICE FEES

The SUMEX facility will not be set up on the basis of fee for service. The relatively small number of users and the fixed facility cost make fee for service algorithms artificial and impede the technical benefit of the facility in exploring research opportunities. New applications or increased loading of the facility may require augmentation of facility components. These will be negotiated on an individual basis with the prospective user, BRRB, and NAIRAC.

Accounting information will be maintained however as the basis for assessing system utilization in accordance with advisory committee wishes. This data measuring system usage by project (CPU, peripherals, etc.) will be used in machine controlled scheduling algorithms as well.

RESOURCE SUBDIVISION AND UTILIZATION

The SUMEX facility will be allocated 50% to the Biomolecular Characterization aspect and 50% to the AI Applications in Medicine aspect of the resource. (A detailed profile of estimated system usage is in preparation).

The SUMEX personnel and non-computer resources are at the discretion of the Principal Investigator and the Facility Director to allocate as appropriate to the implementation of resource goals. This allocation will be consistent with the guidelines set down by the advisory committees. These resources are not specified by resource subdivision since some facility development activities are common to both and detailed allocations will change with time as relative development priorities change.

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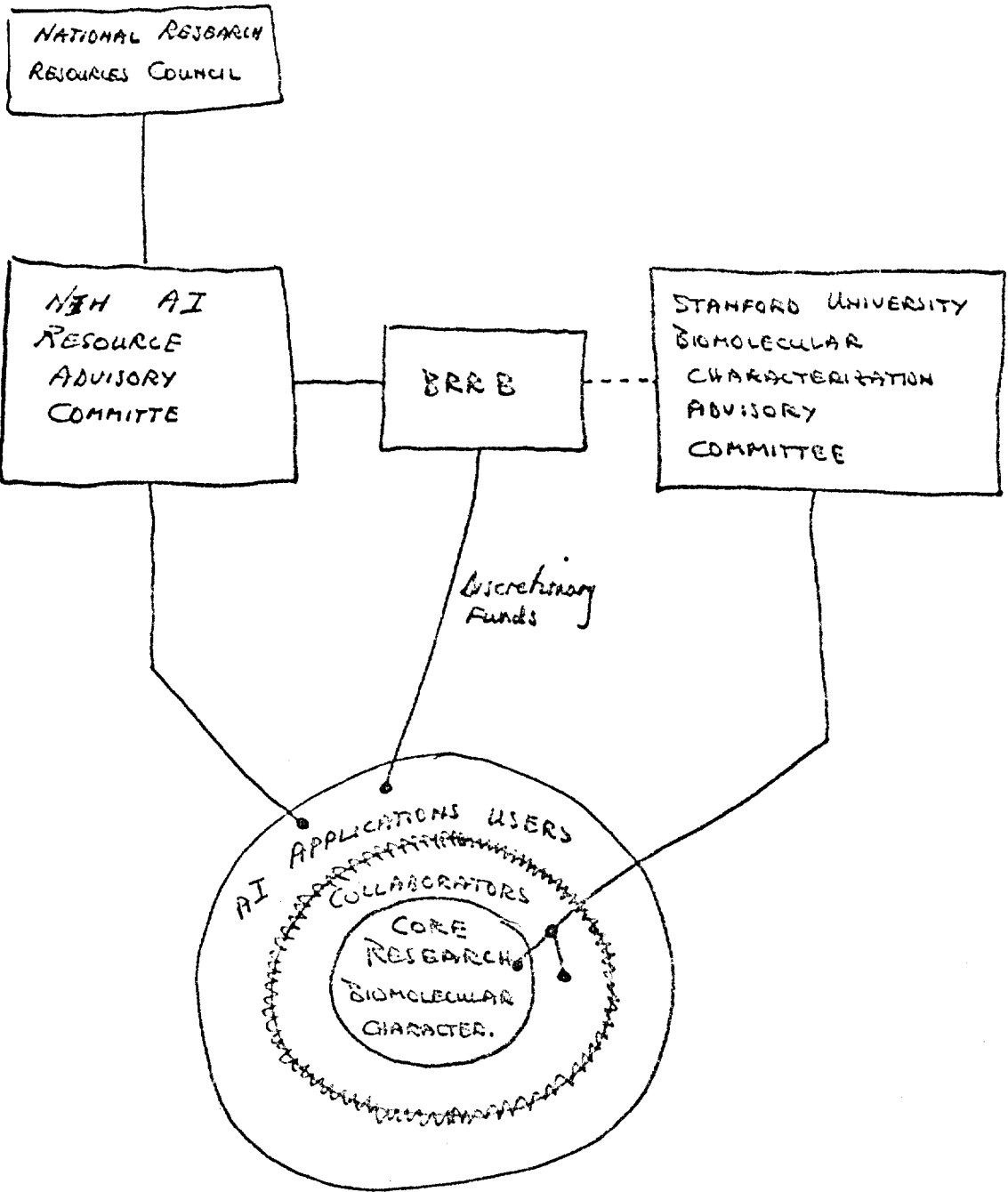


FIGURE 1

SUMEX ADMINISTRATIVE ORGANIZATION