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J. H. SALTZER

25 May 1994

TO: Professor Fernando J. Corbato
        Professor Peter Elias
        Professor Albert R. Meyer
        Professor Jerome H. Saltzer

FROM: Helen W. Samuels

RE: LCS research records project

Enclosed is a draft of the front matter for the finding aid to the administrative records of the Laboratory for Computer Science. We thought it might be helpful for you to see this before next week's meeting.

Our meeting will be on Wednesday, June 1st, 10:00-12:00, in NE43-518. We look forward to seeing you then.

Enclosure

MIT. LABORATORY FOR COMPUTER SCIENCE.

Records, 1961-1988

Archival Collection - AC 268

30 records center cartons
__ document cases
Accession numbers: 89-80 (AC 193),
   89-101 (AC 204), 93-60, 94-1

Processed: 1993-1994
By: Jeffrey Mifflin

ACQUISITION: The records were transferred to the Institute Archives by the Laboratory for Computer Science in 1989, 1993, and 1994.

ACCESS: Access partially restricted according to MIT access policy; consult the Institute Archivist for further information.

        Box __, folders __ are restricted for 50 years

        Box __, folders __ are restricted for 75 years.

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PROCESSING: The processing of the collection was funded by the Laboratory for Computer Science.

CONTENTS

ADMINISTRATIVE HISTORY

Introduction

The MIT Laboratory for Computer Science (LCS) is a laboratory for research in computer science and engineering, first established in 1963 as Project MAC in the Department of Electrical Engineering. The name MAC was chosen because it is an acronym for several significant phrases describing the project and its goals. "Machine-Aided Cognition" was the broad objective. A "Multiple-Access Computer" was the principal tool. "Men and Computers" were the essential partners in the expected symbiosis, a term used by J. C. R. Licklider in his influential 1960 paper entitled "Man-Computer Symbiosis." MAC's creators hoped from the beginning that it would draw together MIT personnel with various interests in the use of computers. These individuals could participate in MAC without abandoning their existing lab affiliations. Hence, MAC was to be a "project" rather than a "laboratory."

By 1967 MAC had separated from the Electrical Engineering Department and started reporting directly to the MIT provost as an interdepartmental lab. The lab's current name was chosen in 1975 and officially recognized in 1976. In 1981, while retaining its interdepartmental status, LCS came under the aegis of the School of Engineering, and the LCS director began reporting to the dean of engineering.

Directors of Project MAC and LCS have been Robert M. Fano (1963-1968), J. C. R. Licklider (1968-1971), Edward Fredkin (1971-1974), and Michael L. Dertouzos (1974-present).

Throughout its history Project MAC/LCS has relied on associate and assistant directors to carry out various administrative responsibilities. The lab's associate directors have been Oliver G. Selfridge (1963-1965), J. C. R. Licklider (1967-1968), Joel Moses (1974-1978), Albert Meyer (1979-1981), Michael Hammer (1979-1982), Ronald Rivest (1981-present), and Albert Vezza (1982-1984 and 1986-present). The lab's rapid growth and burgeoning involvement with industry necessitated two associate directors from 1979 on. During the 1979-1980 academic year Vezza was appointed coordinator of all LCS computational resources, an action required because of the increasing quantity and variety of hardware used in the lab.

LCS assistant directors have been R. G. Mills (1963-1967), M. M. Jones (1967-1971), S. S. Patil (1972-1974), and Pat Anderegg (1987-1988). (Anderegg was, in addition, fiscal officer from 1981 to 1982 and assistant administrative officer from 1982 to 1986. John Hynes was administrative officer from 1980 to 1986.)

Significant dates and activities from the lab's first quarter century are described in the publication prepared by LCS for Project MAC's 25th Anniversary Celebration, inserted here by permission of the Laboratory for Computer Science and Marcel Dekker, Inc. The brochure includes a brief history of Project MAC by Robert Fano and a time line prepared by Peter Elias. These published materials are followed by supplementary historical notes, summarizing major trends at the lab from 1974 to 1988.

The Project MAC 25th anniversary brochure
will be inserted here

Supplementary Historical Notes

When Michael L. Dertouzos took over as Project MAC's fourth director (1974-present) he was eager for a change of direction, recognizing the necessity of making new alliances and of moving on to new problems. He set out to decrease MAC's dependency on DARPA and other government agencies (thereby decreasing vulnerability due to shifts in public policy) by cultivating stronger partnerships with industry. During the Dertouzos era, DARPA funding declined from about 75% in 1974 to about 50% in 1988. The total budget nevertheless expanded from approximately $2,000,000 to approximately $18,000,000 in the same time span.

Dertouzos believed that the designation "project" was inappropriate for a forefront of computer science research. For a short while Project MAC was called MAC Laboratory. Dertouzos and Associate Director Joel Moses decided in 1975 to revamp the name completely and the "project" was transformed into the Laboratory for Computer Science, a permanent academic lab at MIT under the auspices of the School of Engineering.

Dertouzos decided early in his directorship to restructure LCS so that activities fell into four divisions reflecting the diversity of projects and interests. Three of these divisions, formed around 1975, were: Knowledge-Based Programs (making programs more intelligent by capturing, representing, and using specific knowledge); Machines, Languages, and Systems (improving convenience and cost effectiveness of computer use through work in such areas as automatic programming and structured programming); and Theory (exploration of theoretical foundations of computer science). He added a fourth division in 1977: Computers and People (dealing with the societal impact of computers). Each division comprised separate but interacting research groups, whose names, number, and exact areas of responsibility evolved over time. With minor variations, the LCS structure imposed by Dertouzos in the 1970s remained unchanged through 1988. "Parallel Systems" replaced "Computers and People" as a principal division in the 1988-1989 academic year.

Dertouzos believed as early as the mid-1970s that geographically distributed systems would be the future of computing. By 1977 he had launched, with DARPA funding, about half of the LCS staff into work on distributed systems. Distributed systems research involves independent computer systems installed at various locations to process and store data that originate locally. These are tied together by communications networks over which data are exchanged. The lab undertook a wide variety of research problems aimed at improving the organization, reliability, and efficiency of such systems.

A Multiprocessor Emulation Facility (Project Tanglewood) was constructed in the mid-1980s (and opened in the academic year 1985-1986) with funds provided by the Strategic Computing Program of DARPA. Strategic Computing was a program formed by DARPA/IPTO Director Robert Kahn in 1983 to integrate results from basic research in artificial intelligence, VLSI (very large scale integration), and parallel processing to create interactive systems with more capability, flexibility, and intelligence.

LCS in the Dertouzos era became increasingly linked to business, more concerned with the practical problems of industry, and more involved in theoretical research. The work usually focused simultaneously on two or three big projects and many smaller projects.

Project MAC moved into quarters at 545 Technology Square, Cambridge, Massachusetts, in June 1963, and LCS remained at the same address at the time of its 25th Anniversary Celebration in 1988, having undergone numerous space changes, renovations, research reorientations, and a name change. The celebration reunited many alumni of MAC and LCS for research symposia, banquets, and other festivities.

SERIES DESCRIPTIONS

Series I. Annual Review Meetings, 1971-1988

Annual Review Meetings, attended by LCS faculty, group leaders and research associates, were held once a year in May, June, or July to provide a forum for reports on and discussion of current research, with additional discussion about projected future directions. The yearly events, which began in 1971, were known as Project MAC Faculty Meetings, or Faculty Review Meetings, before 1976; thereafter they became Laboratory for Computer Science Annual Review Meetings. Until 1983 meetings lasted one day and took place at Boston area conference facilities. The duration expanded to two days in 1984, when the venue changed to Cape Cod.

Each research group submitted a report of the past year's activities for inclusion in loose-leaf notebooks distributed to meeting participants prior to the event. Starting in 1972, individual faculty members also submitted reports. Attendees were expected to review the notebooks before coming to meetings to ensure informed discussion. Time restraints limited the number of formal presentations in a given year to somewhere between six and twelve, chosen by the director's office on the basis of: time elapsed since previous presentation; changes in research direction; and new results.

The files (box 1, folders 1-18) record the membership of each research group, including academic staff, support staff, and students. Reports describe the work accomplished, who did what, what problems (if any) impeded the research, and what questions were raised by it. They include a great deal of specific information about hardware and software used, including modifications made and results obtained. Edited versions of these reports were incorporated into Project MAC and LCS Progress Reports (removed from AC 268 and cataloged as part of the Tech Collection) and ARPA/DARPA Progress Reports. In addition, an annual report of LCS activities is included in the Annual Reports of the MIT President. The lab also published technical memos and reports, which have been cataloged in the Tech Collection and are discussed more fully in the finding aid for the LCS Research Records.

The Annual Review Meeting files provide convenient summaries of specific research projects for any given period in MAC/LCS history after 1970. Over the long term the reports document various gradual shifts in research priorities and concentrations, from continuing emphasis on time-sharing in the early 1970s, to automatic programming in the Fredkin era, to distributed systems, multiprocessing, and strategic computing under Dertouzos.

Information in the files is supplemented by Annual Review notes (   ) in Series II, containing remarks made by LCS Director Michael Dertouzos at the meetings, which were not included in the notebooks.

Folders are arranged chronologically.

Series II. Directors' Files, 1971-1988

Series II documents the administrative activities of Edward Fredkin (   ) during the years 1971 to 1974 when he directed Project MAC, and of Michael Dertouzos (   ) during the first fifteen years of his MAC/LCS directorship, 1974 to 1988. (A few folders include documents from 1989-1992.) The series contains no directors' files for Robert Fano (1963-1968) or J. C. R. Licklider (1968-1971). Grants and contracts files maintained by Fredkin and Dertouzos have been merged with similar files from other offices to form Series V.

Edward Fredkin's directorship was characterized by a prevailing sense that MAC's future (following the completion of the Multics project) would necessarily involve dramatic changes in direction. The folder entitled "MacBig (Make MAC the Best in the Galaxy)" includes memos in which project members discuss impending changes in priorities, 1971 (   ). Other files contain correspondence (   ) regarding the status of Multics, 1971-1973, and correspondence and agendas documenting Fredkin's representation of MAC at meetings and conferences (   ).

Fredkin's feeling was that choices made at MAC in the early 1970s could influence the future of humanity because of the inevitable impact that computer use would have on society. These views are reflected by remarks prepared by him for the 1971 ARPA/IPTO Principal Investigators' Meeting, removed from Series II to form part of Series V (   ). His report delivered at the same gathering in 1973 outlines MAC's new directions, describing a shift of focus from time-sharing to automatic programming, plus substantial reorganization (   ).

Many files created by Michael Dertouzos during his directorship document a diversity of projects funded by corporations or government agencies. Proposals, reports, and related correspondence about such research activities have been merged with other materials in Series V (   ). Other information about research projects can be found in Series II under the name of the project, including folders about multiprocessing research filed as Multiprocessor Emulation Facility, 1985 (   ). Additional information about distributed systems research is found (   ) in Distributed Systems Meetings files, 1977-1980, and planning files, 1979-1980 (   ).

Annual Review Meeting notes (   ) contain charts and remarks presented by Dertouzos at the meetings from 1975 to 1988. These presentations include summaries of the lab's status and plans, including budget information. Also of interest are Breakfast Meeting files, 1975-1987 (   ). These meetings were attended by LCS leadership as a forum for exchanging news about group budgets, current status of projects, and future plans, and for discussing issues of laboratory-wide interest.

The Executive Committee (Project MAC and LCS) was established by the director's office to discuss and make decisions about administrative and research matters of laboratory-wide interest. The director, associate directors, administrative officer, senior faculty (including research group leaders), and occasional invitees sit on the committee. Decisions made by EXCOMM are used by the director to establish fiscal policies, make appointments and promotions, assess the relevance of proposed special activities, and determine the disposition of other matters. Individuals at the lab raise concerns in EXCOMM by bringing them to the attention of committee members. The committee met weekly when first established in the 1970s, but later met three or four times a year, or as the need was perceived. EXCOMM records (   ) include information about a wide spectrum of activities at the lab, including finances, organization, research, and personnel, 1975-1987. Restricted documents regarding promotions and other personnel issues have been removed and filed separately in box __, folders __ to __.

Files on MIT's Committee on the Changing Nature of Information, 1977-1984, document the contributions of Dertouzos and other LCS faculty members to discussions of cryptography, privacy in interconnected computer systems, legal status of data, copyright of software, and other issues (   ). The involvement of LCS in software rights is also illustrated by folders (   ) pertaining to the MIT Committee on Software Rights, 1983-1985, of which Dertouzos was chairman. These files document attempts to develop an MIT policy for the fair allocation of rights and controls among software creators, the Institute itself, and third parties such as grantors.

A folder on organization of LCS, 1974-1986, details continuing efforts to promote greater efficiency at the lab by altering the structure of internal administrative operations ( ). Folders on space planning and renovations, 1979-1988, describe solutions to problems in the arrangement of hardware and personnel, allowing physical change to occur without disrupting existing group relationships ( ). Dertouzos' telephone message logs, 1981-1987, document the multiplicity of major and minor concerns that come regularly to the attention of the director of an academic research lab ( ).

Educational Computing folders, 1982-1987, illustrate LCS involvement with MIT's Project Athena, including planning and follow-up activities ( ).

Dertouzos' correspondence with the dean of engineering contains a discussion of whether computer science should or should not be a required subject at MIT, as well as papers pertaining to a possible split of Electrical Engineering and Computer Science into two separate departments ( ).

The Siemens/MIT historical summary (1980-1992) folder contains a summary of the twelve-year collaboration between LCS and the Munich-based corporation ( ). The document describes the mutually beneficial relationship in which Siemens gave money to the lab and sent research personnel to LCS on prolonged visits to acquire expertise. Many at LCS felt that the arrangement allowed an influx of stimulating ideas better obtained from industry than elsewhere.

Dertouzos' extensive correspondence with government agencies and industrial corporations documents his attempts to maintain close ties with many contacts as a way of creating a broad base of support for research and decreasing LCS dependency on any one source ( ).

Folders are arranged alphabetically under each director's name.

Series III. Associate Directors' Files

LCS associate directors worked with the director on all facets of lab administration and, in particular, on the formulation of long-range plans.

Joel Moses was associate director from 1974 to 1978; Albert Vezza held the same position from 1982 to 1984 and 1986 to the present. The associate directors' files document the administrative activities of these two men during their dates of tenure up to 1988. Grants and contracts files maintained by Moses and Vezza have been removed from Series III and merged with similar materials in Series V. The series contains no files created by Associate Directors Oliver Selfridge (1963-1965), J. C. R. Licklider (1967-1968), Albert Meyer (1979-1981), Michael Hammer (1979-1982), or Ron Rivest (1981-present).

Joel Moses' records include Moses' notes, memos, and correspondence pertaining to his work with MIT committees ( ) as well as other committees and attendance at meetings and conferences ( ) as a representative of LCS, 1974-1978. Of particular interest is material regarding LCS participation in the MIT Common Core Committee, 1976-1977, in which various lab members discuss projections about the future importance of computers and use of computers in schools, with emphasis on educational objectives and attitudes ( ). Moses' correspondence as associate director ( ) deals with LCS policies, visitors to the lab, MACSYMA business, and other matters, 1974-1978.

Albert Vezza's records contain correspondence with corporations and granting agencies regarding tests, terms, equipment needs, proposed work, meetings, and other matters. These materials document his interactions as associate director with DEC ( ), IBM ( ), Texas Instruments ( ), and other organizations, 1982-1987. Folders on physical plant matters, including space needs and space planning ( ), describe problems and solutions

pertaining to the lab's special requirements for cooling, security, ergonomic arrangement of equipment, space constraints, and other matters, 1983-1989. Files about Hacker Heaven (Hacker Farm) include Vezza's 1982-1986 correspondence about the UROP project, which was designed to interest undergraduate students in computer science research careers ( ). Included are essays written by undergraduates describing what computer research they hoped to do if offered the opportunity. Computational Resource Meeting folders ( ) document the role of Vezza and other LCS members in long-range planning for the lab in the 1980s. Other correspondence includes information about visitors to LCS ( ), security matters ( ), the development and testing of electronic mail ( ), the LCS Distinguished Lecturer Series ( ), computer vandalism and intruders on systems used at the lab ( ), and informal reports by outside users of their successes or failures using software developed at LCS, 1982-1988 ( ).

Moses' files come first in the series, followed by Vezza's files. Under each name folders are arranged alphabetically.

Series IV. Administrative Records

Series IV brings together general administrative files from the LCS central office which were removed from active use and placed in storage but which did not specifically form part of the directors' or associate directors' files.

The series includes the chronological correspondence, 1984-1988, of Pat Anderegg ( ) in her capacity as assistant administrative officer and assistant director, administration, and the office files of John Hynes, LCS administrative officer from 1980 to 1986, interfiled alphabetically by subject. The Anderegg material deals with many facets of the daily operations of the lab, including preparations for visitors, travel policies, licensing, arrangements for special events, equipment needs, and use of facilities. The bulk of the Hynes material concerns contracts between the lab and corporations or government agencies, rights in data, and other legal matters.

LCS compiled historical facts and solicited reminiscences in preparation for its 25th anniversary celebration in October 1988. The lab went to great lengths to identify, locate, and invite former members and others who had played a critical role in the development of Project MAC and LCS. These preparations are well documented in the Anniversary (25th) subseries, which contains lists of attendees ( ), historical materials collected for creation of a time line ( ), and videotapes of proceedings ( ), including presentations of current (ca. 1988) research by participants.

The series also includes technical files containing blueprints, wiring schemes, notes, correction logs, and crash reports documenting hardware used and programs tried. Of special interest are wiring schemes for computer systems ( ) from the fledgling years of time-sharing, 1963-1967, and Multics crash reports, 1972-1973, documenting problems with and attempts to de-bug the difficult system ( ). Additional crash reports for the Digital Equipment Corporation PDP-10 computer acquired in the early 1970s because of its highly interactive capabilities illustrate the trials and errors that co-existed with insight and planning as Project MAC adapted to new equipment ( ).

Two groups of internal Project MAC Memos, designated "A" and "M", afford considerable insight into the activities and interactions of MAC personnel in the mid-1960s. The "A" Memos, 1963-1966, disseminate news of general interest, summarize meetings, and provide other information ( ). "M" Memos, 1963-1967, tend to be more technical, focusing on specific research problems and their proposed or accomplished solutions ( ).

Other folders in the series document the administrative aspects of software development (   ), visitors to the lab, the name change of 1975-1976 (   ), LCS committees and LCS participation on MIT committees (   ), space allocation (   ), and other matters.
The series is arranged in alphabetical order.

Issues of *Gateway* (the LCS newsletter, 1983-1988) have been removed from Series IV and cataloged into the Tech Collection. These publications offer a light-hearted look at the lab's activities, including humorous stories and news about social events and changes in personnel, as well as new equipment and projects.

Series V. Grants and Contracts Files, 1963-1988

Series V brings together proposals, reports, and related correspondence documenting Project MAC/LCS interactions with government agencies and private organizations regarding funding of research. Many folders in the series were originally part of the directors' and associate directors' files. Other folders were originally maintained as part of the LCS central office general administrative files. Where known, the name of each folder's creator has been added in parentheses to the folder title.

Grants and contracts files constitute a significant portion of the LCS administrative records. Most folders contain a proposal from Project MAC or LCS to a granting agency or corporation. Many folders contain related correspondence or notes in addition to the formal proposal. Grants and contracts files illustrate: the predominance of ARPA/DARPA funding at Project MAC, especially in the mid-to-late 1960s, when computer time-sharing was the principal focus of MAC research; the gradual replacement of portions of ARPA/DARPA money by funds from other sources, including other government agencies and private industry through the 1970s and 1980s; and changes in research concentration throughout the '70s and '80s, including diversification of efforts to embrace a number of small projects as well as large efforts like multiprocessing and strategic computing.

Projects like Multics (   ), clinical decision-making (   ), the LCS Common System (   ), dynamic modelling (   ), intelligent automata (   ), and MACSYMA (   ) are represented. Grantors include Digital Equipment Corporation (DEC) (   ), the Energy Research and Development Administration (ERDA) (   ), Honeywell (   ), International Business Machines (IBM) (   ), the National Aeronautics and Space Administration (NASA) (   ), the National Institutes of Health (NIH) (   ), the National Science Foundation (NSF) (   ), Texas Instruments (   ), and other organizations.

An especially important group of folders (   ) documents the relationship between LCS and its principal funding agency, ARPA/DARPA, between 1963 and 1988. ARPA was the original and sole support for Project MAC in 1963 and continued to be a significant benefactor throughout the first twenty-five years of MAC/LCS. These files include correspondence regarding meetings with ARPA/DARPA personnel and other matters, proposals to do funded research, and progress reports. They document the shifting and evolving priorities of research at LCS, including: concentration on time-sharing in the 1960s, distributed systems in the late 1970s and early 1980s, and strategic computing and multiprocessing in the 1980s; an interest in Morse Code research in the 1970s; and other matters. Records pertaining to the IBM/MIT joint study in the late 1970s and early 1980s document the assistance LCS furnished to IBM in development of design criteria for future data processing systems (   ). Contributions of DARPA as well as IBM to the lab's Multiprocessor Emulation Facility are well represented (   ). Folders on Western Digital Corporation (   ) illustrate the development and commercialization of NuBus, a

hierarchical bus structure created at LCS in the early 1980s. Additional folders document a diversity of smaller projects funded by corporations or government agencies, to which a portion of lab resources were always directed in the Dertouzos era. Other information about these projects can be found in Series II, directors' administrative files, under name of project.

Information about multiprocessing research is also contained in the Multiprocessor Emulation Facility, 1985, folder in the Dertouzos administrative files. Additional information about distributed systems research is found in the same series in Distributed Systems Meetings files (   ), 1977-1980, and planning files, 1979-1980 (   ).

Files are arranged alphabetically, first by names of agencies or corporations, and then by project. Proposals for projects with specific names are filed alphabetically by title. Requests for general support are filed chronologically under "proposals for continuation of research."

RELATED MATERIALS NOTE

Additional information about administrative activities at LCS is located in the published materials in the Tech Collection at the MIT Archives. Interested researchers should consult Annual Reports to the President of MIT, *Gateway* (the LCS newsletter), Project MAC Memos, Project MAC and LCS Progress Reports, and LCS Quarterly Progress Reports to DARPA. Project MAC and LCS Technical Memos and Technical Reports have also been cataloged and are discussed in the LCS Research Records finding aid.

Additional information about activities at LCS is located in a number of related archival and manuscript collections in the MIT archives. Interested researchers should consult the following collections:

LCS Research Records	AC __
Fernando Corbato Papers	MC 371
Michael Dertouzos Papers	MC 372
Robert M. Fano Papers	84-51
Edward Fredkin Papers	MC 373
Shafi Goldwasser Papers	MC 374
Michael Hammer Papers	MC 375
Carl Hewitt Papers	MC 376
William A. Martin Papers	84-9 and 94-41
Albert Meyer Papers	MC 377
Joel Moses Papers	MC 378
Jerome Saltzer Papers	MC 379
Barry Trager Papers	MC 380
Albert Vezza Papers	MC 381
Steven Ward Papers	MC 382
Joseph Weizenbaum Papers	MC 383