Guide to the George A. Michael papers

Finding aid prepared by Bo Doub, Kim Hayden, and Sara Chabino Lott
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Contributing Institution: Computer History Museum
Language of Material: English
Physical Description: 65.92 Linear feet, 49 record cartons, 1 manuscript box, 2 oversize flat boxes, and 1 small flat box
Date (bulk): Bulk, 1953-1991
Date (inclusive): 1945-2000
Abstract: The George A. Michael papers consist of material related to the growth of the supercomputing industry and Lawrence Livermore National Laboratory's (LLNL) computing activities while Michael worked there as a computational scientist from 1953 to 1991. The collection reflects Michael's key role in the advancement of supercomputing inside and outside of LLNL, with reports, manuals, articles, and records related to conferences and projects from LLNL, Los Alamos National Laboratory, and other computing companies and organizations. His personal projects are also represented.
Languages: The majority of the material in the collection is in English, but there is a small amount of material in French, German, and Italian.
Processing Information
Collection processed by Bo Doub and Kim Hayden, August 2015.
Access Restrictions
The collection is open for research.
Publication Rights
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Preferred Citation
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Immediate Source of Acquisition
Biographical/Historical Note
George Anthony Michael was born February 16, 1926, in Buffalo, New York. He first attended the University of Niagara in Niagara Falls, New York, and then moved across the country to attend the University of San Francisco, where he earned a degree in physics in 1952. The following year, Michael went to work as a theoretical physicist for Lawrence Livermore National Laboratory (LLNL) in Livermore, California, known then as the University of California Radiation Laboratory. Michael spent the majority of his career at LLNL.
During his 41-year career at LLNL, Michael played a large role in building the Laboratory's high performance computing (HPC) program, which led to LLNL gaining an international reputation as a leader in supercomputing. He co-founded the Salishan Conference on High-Speed Computing in 1981 and also the annual ACM/IEEE Supercomputing Conference, first held in 1988. Through these activities and other initiatives, Michael was essential in improving communications and dialogue between national laboratories, academia, government, and private industry in the field of high-performance computing.
Michael retired from LLNL in 1991, but continued to be active in the HPC community following his departure from the laboratory. Starting in 1995, Michael worked on compiling written histories and recording oral histories on the beginnings of computing at LLNL. Michael died on June 5, 2008, in Livermore, California.
Scope and Content of the Collection
The George A. Michael papers are primarily made up of records Michael collected while he worked as a computational scientist at LLNL from 1953 to 1991. His role in the development and advancement of supercomputing is well-represented in his papers.
The first series of the collection is made up of materials created at LLNL that document the lab's computing projects and research, computing environment and programs, administrative issues, and conferences and events. This series is broken up into eight subseries.
The rest of the collection consists of material created by or related to other companies and organizations, including a large number of computer manuals. The majority of manuals are from DEC, CDC, Remington Rand, and IBM, and these companies each have their own series in the collection. The other less-represented companies’ manuals are grouped together in a separate series. Technical papers and reports published by universities, research groups, and the U.S. government are included in the collection. Additionally, there is a large number of periodicals, including magazines and journals, and promotional material from various companies. The collection also contains material related to computer conferences and workshops, many of which Michael attended or participated in as a speaker or leader. A small portion of the collection contains material from Los Alamos National Laboratory (LANL), including LANL conference records and technical reports.

The smallest portion of the collection is made up of Michael's personal papers. Most of these are related to his own projects and his role on the board of trustees in the early days of the Computer History Museum.

**Arrangement**

The collection is arranged into 12 series:

Series 1, Lawrence Livermore National Laboratory, 1950-1997
Series 2, DEC manuals, 1961-1985
Series 3, CDC manuals, 1962-1979
Series 4, Remington Rand manuals, 1950-1962
Series 6, Other manuals and specifications, 1952-1991
Series 7, Technical papers and reports, 1955-1996
Series 8, Conferences, presentations, workshops, and course materials, 1949-1994
Series 9, Periodicals, articles, and clippings, 1954-2000
Series 10, Promotional materials, catalogs, and directories, 1954-1994

**Related Collections at CHM**


**Subjects and Indexing Terms**

Control Data Corporation
Digital Equipment Corporation
International Business Machines Corporation
Lawrence Livermore National Laboratory
Los Alamos National Laboratory
Michael, George A.
Remington Rand, Inc.
Supercomputing
Lawrence Livermore National Laboratory records, Series 1, 1950-1997

Language of Material: English

Series Scope and Content
This series consists of records created at LLNL from 1950 to 1997. Material includes reports, papers, and manuals published by LLNL, administrative documents and internal communications, conferences and workshops put on by LLNL, project records, and technical data.

Arrangement
It is organized into the following subseries:
Subseries 1.1, Projects, 1958-1992
Subseries 1.3, Equipment, 1953-1990
Subseries 1.4, Periodicals and newsletters, 1952-1991
Subseries 1.5, Technical papers and reports, 1953-1987
Subseries 1.6, Manuals and specifications, 1950-1993
Subseries 1.8, Program listings and associated output, 1954-1984

Projects, Subseries 1.1, 1958-1992

Language of Material: English

Subseries Scope and Content
This subseries contains material that documents projects and research undertaken by LLNL from 1958 to 1992. The majority of projects are related to supercomputing research, including the development of the S-1 supercomputer, mass storage, and optical scanning. The largest group from this subseries concerns a joint research and development project with the Massachusetts Institute of Technology (MIT) that focuses on dataflow computer architecture, including parallel computing. There is a smaller amount of material on the creation of the Defense Data Network for the U.S. Defense Communications Agency and research into the use of holograms in the medical field, computational mathematics, and spatial modeling. Some of the organizations and companies working with LLNL on projects in this subseries include Control Data Corporation, the U.S. Department of Energy, and Hughes Aircraft Company. There are also materials related to research trips between Japan and the United States that gave LLNL an overview of the Japanese computing industry. This subseries is arranged chronologically.

102734636 Optical scanning and film readers 1958-1968
102734638 Computer filmmaking 1963-1965
102734634 Data flow computer joint research project with MIT 1963-1988; bulk 1977-1979
102734642 Line Drawing System Model 1 (LDS-1) 1970-1974
102734647 Other projects and research 1971-1986
102734637 S-1 supercomputer 1976-1985
102659257 Mass storage 1977-1992
102659270 Japanese computing 1981-1985
102734641 Panel on Large Scale Computing in Science and Engineering and SPREAD 1982-1983
102734646 Vaxima 1985-1991

Subseries Scope and Content

This subseries contains LLNL administrative records relating to personnel, policies, training, and events. The bulk of this subseries consists of materials relating to personnel and management. The personnel records include correspondence and writings about hiring and managing employees as well as organizational charts of LLNL's Computation Department. This subseries also contains administrative notes and messages left for Michael regarding appointments, contacts, and events. Many of the events documented in this subseries relate to scheduled visitors coming to the laboratory and also LLNL employees visiting other institutions. Also included in this subseries are policy and planning records, including a "University of California Computing Plan, 1977-1982," which was created to develop methodologies for providing computing capacity and services throughout the UC system. Computer and network security is a significant topic in this subseries, with relevant LLNL policies and records about the NASA Ames/LLNL Security Discussion Group. Lastly, this subseries contains a small amount of organizational overviews and financial reports (including annual reports) from LLNL and from peer organizations, such as CERN and the Rutherford Appleton Laboratory. This subseries is arranged alphabetically by folder title.

102734648 Computer and network security 1982-1989
102739073 Lawrence Livermore National Laboratory (LLNL) Computer Information Center publications indices 1969-1971
102659269 Lawrence Livermore National Laboratory (LLNL) overviews and financial reports 1974-1986
102734652 Notes, contacts, and scheduling 1969-1989
102734649 Numerical Aerodynamic Simulation (NAS) Project 1984-1993
102734650 Overviews and annual reports from peer organizations 1959-1986
102734669 Personnel and management 1957; 1972-1997
102734667 Policies and planning 1953-1993
102739074 Training materials 1982-1991
102734668 Updates from the Numerical Mathematics Group (NMG) of the Lawrence Livermore National Laboratory (LLNL) Computation Department 1970-1984
102734663 Visits to Lawrence Livermore National Laboratory (LLNL) and other events 1977-1986

Equipment, Subseries 1.3, 1953-1990

Subseries Scope and Content

This subseries consists of records related to computing and the equipment used at LLNL, including computers and their input/output devices, operating systems, software, storage, and networking. The largest group in this subseries contains material about LLNL's research and procurement of graphical data processing equipment for the lab, including displays, filming equipment, microfilm, drawing devices, enlargers, copiers, and printers. A smaller, but significant, number of records is related to LLNL's computers, which include the UNIVAC-1 and DEC VAX, and the supercomputers UNIVAC LARC, CDC 6600, CDC 7600, CDC STAR-100, and Cray-1. There is also material related to ARPANET and LLNL's high-speed data communications system Octoport, storage options, time-sharing scheduling, and planning for equipment needs. This subseries is arranged alphabetically by folder title.

102734664 CDC 6600 and 7600 1963-1984
102734662 CDC STAR-100 1971-1976
102734661 Cray 1971-1985
102734656 DEC 1968-1990
102734666 Graphical data processing 1963-1985
102739075 Indices and schematics 1968-1976; 1981
102734655 Networking 1975-1986
102734660 Planning 1962-1985
Periodicals and newsletters, Subseries 1.4, 1952-1991

Subseries Scope and Content
This subseries is made up of newsletters, newspapers, and magazines published by LLNL for its employees, with most covering issues and updates related to computation at the lab. These date from 1952 to 1991. About half of these periodicals are published by the lab’s computation department and are related to its computer network, Octopus. These include Octogram, Octopus Communiqué, and Tentacle. There is also a small group of newsletters published by the Society of Professional Scientists and Engineers, the union that represented engineers and scientists at LLNL. Additionally, there is a small number of publications that cover general LLNL news of interest to staff. This subseries is arranged alphabetically by folder title.

Technical papers and reports, Subseries 1.5, 1953-1987

Subseries Scope and Content
This subseries contains technical papers and reports published by LLNL from 1953 to 1987. A small group of these were authored by Michael. The bulk of this subseries is made up of technical reports, with a smaller number of technical papers. The reports and papers span a range of computing topics, such as multiprocessors, archival storage, programming, and graphical processing. This subseries is arranged alphabetically by folder title.
Manuals and specifications, Subseries 1.6, 1950-1993

Subseries Scope and Content
This subseries is made up of manuals and specifications created by LLNL for the machines and systems used at the lab. Materials date from 1950 to 1993. Included are programming and user manuals for the Cray-1, CDC 6600, CDC 7600, UNIVAC-1, LARC, PDP-1, PDP-10, PDP-11, and IBM 7094, 3600, 704, and 7030 computer systems. Also included are manuals for the Livermore Time Sharing System (LTSS), the network system Octopus, the operating system Chippewa, high-speed printers, and graphical processing programs and hardware. There is also a large number of LLNL Computation Division Computer Information Center reports, which consist of descriptions and instructions for various programs, utilities, and subroutines. Specific programming language manuals include Praxis, TRIX, LRLTRAN, and Fortran. This subseries is arranged alphabetically by folder title.

102739133 CDC 6600 system and programming manuals 1965-1968
102734694 CDC 7600 system and programming manuals 1970-1982
102739142 CIC reports 1965-1971
102739046 Code utilities and applications 1960-1985
102739131 Computer Hardcopy Output Recording System (CHORS) manuals 1973-1983
102739134 Cray and CDC 7600 programming manuals 1976-1982
102734695 Cray-1 system and programming manuals 1980-1993
102739052 Fortran graphics 1977-1988
102739143 IBM programming manuals 1959-1966
102739045 Livermore Time Sharing System (LTSS) 1967-1984
102739144 Other computer systems and hardware manuals 1963-1993
102739130 PDP systems and programming manuals 1962-1966; 1980
102739136 TRIX manuals 1972-1985
102739048 UNIVAC-1 and LARC system manuals 1950-1966

Conferences, presentations, workshops, and course materials, Subseries 1.7, Bulk, 1974-1995 1955-1995

Subseries Scope and Content
This subseries consists of material relating to conferences, presentations, and courses that were held at or put on by LLNL. The conference with the largest amount of records is the Salishan Conference on High-Speed Computing, which Michael co-founded and organized in 1981. The Salishan Conference materials (named after its venue at the Salishan Lodge in Gleneden Beach, Oregon) include administrative correspondence, presentation materials, notes, schedules and agendas, lists of attendees, speaker information, and personal correspondence of people thanking Michael for organizing the conference, including a letter from Gordon Bell of DEC. The other conference that Michael co-founded, the ACM/IEEE Supercomputing Conference, is also documented in this series, but to a lesser extent. This series also contains a significant amount of presentation slides, notes, and administrative correspondence relating to presentations that took place at LLNL. Many of these presentations were given by members of LLNL's Computation Department, but some were also given by visiting representatives of other companies and organizations. Course materials—mostly from LLNL's continuing education program—and records relating to LLNL meetings are also included in this collection. This subseries is arranged alphabetically by folder title.

102734697 Computer Information Exchange (CIE) proceedings 1968-1989
102739137 Computer Operations Committee (COC) meetings 1974
102739129 Course materials 1955-1986
102739140 IEEE Symposium on Mass Storage Systems 1990
102739122 Lawrence Livermore National Laboratory (LLNL) workshop and conference proceedings 1975-1993
Program listings and associated output, Subseries 1.8, 1954-1984

Subseries Scope and Content

This subseries contains program listings, output, and benchmarks from programs developed at LLNL. Programs documented in this subseries include a location routine (also called "Miller's routine"), a program for plotting figures on a chart called Plott, a function titled "Hardy," a program that reads tapes and copies files called RESTORPU, an error-contingency routine, and a program titled Convolution Integral Film Program — nicknamed, "Nilsson's Nuggets." Programming languages represented include Fortran. Most of the output in this subseries consists of simulation output in the form of plots and graphs. Also included are program descriptions, benchmarks (performance tests), design drawings, and flowcharts. This subseries is arranged alphabetically by folder title.

DEC manuals, Series 2, 1961-1985

Series Scope and Content

This series contains mostly manuals and reference cards published by the Digital Equipment Corporation (DEC). Many of the manuals in this series focus on the Programmed Data Processor (PDP) series of minicomputers, particularly the PDP-11. Also included are software manuals, many relating to the Fortran programming language, and manuals concerning other machines and systems, such as the VAX-11. One book contained in this series relates to DEC equipment and was published by DEC, but it is not specifically focused on a single machine or software system. This book is titled, "Introduction to minicomputer networks." This series is arranged alphabetically by folder title.

CDC manuals, Series 3, 1986-1979

Series Scope and Content

This series contains manuals and specifications published by the Control Data Corporation (CDC) from 1962 to 1979. The machine with the largest amount of materials is the CDC 7600. Other CDC hardware documented in this series include the CDC STAR-100, CDC 6000 series machines, CDC 8500, and CDC 1604. Programming languages represented in this series include FORTRAN, various versions of Compass, and COBOL. Also included are materials relating to the CDC Chippewa operating system. This series is arranged alphabetically by folder title.
Remington Rand manuals, Series 4, 1950-1963

Series Scope and Content
This series contains manuals, program descriptions, notes, and a small amount of memoranda relating to UNIVAC systems and Remington Rand. The largest part of this series relates to UNIVAC LARC (Livermore Advanced Research Computer), which was designed in order to run programs and simulations relevant to projects at LLNL. Another focus of the materials in this series is on the UNIVAC I, with manuals and other documents including publications by Remington Rand, software documentation, and memoranda and technical papers relevant to UNIVAC I machines. This series is arranged chronologically.

IBM manuals, Series 5, Bulk, 1953-1975 1945-1992

Series Scope and Content
This series primarily contains manuals published by the International Business Machines Corporation (IBM), with a small amount of specifications and technical bulletins that contain addenda to manuals. IBM machines with the largest amounts of documentation in this series include the IBM 704, 709, 7090, 7030, 1401, 1440, and 1460. Also included are instructional guides for using programming languages: COBOL, Basic, DOS 3.1, and FORTRAN. Other types of machines covered in these manuals include accounting machines, punched card machines, printers, and collators. This series is arranged chronologically.

Other manuals and specifications, Series 6, 1952-1991

Series Scope and Content
This series is made up of manuals and specifications from companies and for systems that do not have their own series in the collection, dating from 1952 to 1991. Included are manuals for computer systems and components from companies like Convergent Technologies, Cray, Hewlett Packard, Integrated Software Systems Corporation, Intel, Scientific Data Systems, Technical Design Labs, Varian, and Texas Instruments. There are several manuals for Unix and CP/M operating systems, as well. Also included are user's manuals for commercial software and manuals for hardware components, such as keyboards, hard drives, graphics equipment, and the Unicon laser storage system. There are also a number of manuals specifically published for programmers and developers. This subseries is arranged alphabetically by folder title.

Convergent Technologies 1980-1982
This series contains technical reports and papers on various computing and supercomputing topics dating from 1955 to 1996. A little less than half of these were published by American, European, and Japanese universities, including Stanford, Carnegie-Mellon, UC Berkeley, University of Illinois at Urbana-Champaign, the Royal Institute of Technology in Stockholm, and Osaka University. About a quarter of the reports were published by different departments of the U.S. government, including the Department of the Navy, the Department of Defense, the Department of Energy, the Department of Commerce's National Technical Information Service, and NASA. Lastly, there are papers and reports published by technology companies and research groups, such as IBM, the RAND Corporation, Eastman Kodak, General Electric, Lockheed, Sandia Laboratories, and SRI. This series is arranged alphabetically by folder title.

This series contains materials from conferences, presentations, and courses that were not held at LLNL or Los Alamos National Laboratory. The conference that is most well-documented in this series is SIGGRAPH, which stands for the Special Interest Group on Computer Graphics. Included are SIGGRAPH conference proceedings published in the Association for Computing Machinery (ACM) periodical Computer Graphics, Michael's notes from these conferences, workshop materials, computer graphics and postcards, pamphlets, and attendee lists. Other conferences and workshops that are significantly represented in this series include the 1983 Conference on Monte Carlo Methods and Future Computer Architectures held at Brookhaven National Laboratory, early IBM computation seminars (1949-1951), and the 1983 Parallel Architecture Workshop (PAW) at the University of Colorado, Boulder. The records relating to conferences and workshops where Michael served as a speaker, program chairman, or president are grouped together in this series. This series is arranged alphabetically by folder title.

Technical papers, Series 7, 1955-1996

Conferences, presentations, workshops, and course materials, Series 8, 1949-1994
Conferences, presentations, workshops, and course materials, Series 8, 1949-1994

Guide to the George A. Michael papers

Periodicals, articles, and clippings, Series 9, 1945-2000

Series Scope and Content
This series consists of journals, magazines, newsletters, clippings from newspapers and magazines, and photocopies of articles and books from 1954 to 2000. The main focus of the material in this series is on computer technology. Companies and organizations with journals in this series include the Association for Computing Machinery, Argonne National Laboratory, the IEEE, and IBM. In addition to Scientific American, Datamation, and magazines about physics, computing, and specific computer systems, like the Commodore, this series has a large number of issues of Call-A.P.P.L.E., a magazine published by the cooperative, independent Apple user group Apple PugetSound Program Library Exchange (A.P.P.L.E.).

Newsletters in the series are from both computer and technology companies such as Computer Control Company, Sanborn Company, DEC, Kodak, and Hewlett Packard, and organizations such as SIGARCH, the Computer Architecture Technical Committee, the Society of Photo-Optical Instrumentation Engineers, and the Charles Babbage Institute. This series is arranged alphabetically by folder title.

Promotional materials, catalogs, and directories, Series 10, 1954-1994

Series Scope and Content
This series contains promotional material and catalogs from 1954 to 1994. The bulk of the series is made up of product brochures, company overviews, technical specifications, marketing newsletters, and installation and operational brochures published by companies such as Digital Equipment Corporation, Burroughs, Goodyear Aerospace, Scientific Data Systems, Remington Rand, Amdahl, and Polaroid. This series also contains three 1979 volumes of The Computer Display Review, a subscription-based reference set that reviewed computer displays and related display products. Also included are catalogs and brochures for microscopes for use in the computer and semiconductor industry, hand tools, and lab supplies. This series is arranged alphabetically by folder title.

Series Scope and Content
This series contains technical papers and reports, administrative records, manuals, and conference and presentation materials published by or related to Los Alamos National Laboratory (LANL). One large part of this series is composed of materials for two conferences hosted by LANL, both titled “Frontiers of Supercomputing.” The first of these conferences took place in 1983, while the second 1990 conference revisited the themes of the first and was titled “Frontiers of Supercomputing II: A National Reassessment.” Included are agendas, attendee lists, press, speaker photographs, and viewgraphs of many of the presentations for both conferences. Another large part of this series is made up of technical papers and reports. Most of these writings relate to supercomputing, with one authored by Michael — though some cover topics not related to computing, such as the LANL publications on rock physics, shale oil, and hydrodynamical equations. The rest of this series is made up of in-house programming manuals, LANL administrative records, an annual report, presentation materials, and other publications published by LANL. This series is arranged chronologically.


Scope and Content of the Collection
This series contains personal correspondence, materials relating to personal projects and research, books, clippings, photographs, and records from Michael's role on the Board of Trustees for the Digital Computer Museum (later renamed the Computer Museum and subsequently the Computer History Museum). Approximately half of this series is related to the Digital Computer Museum, with documents from its early years spanning 1981 to 1986. Of interest in this part of the series is correspondence between Gwen Bell, the first president of the Computer Museum in Boston, and Michael — with letters documenting museum planning and delegations of responsibilities. This series also contains materials from Michael's personal projects and research, which include records relating to various historical projects that Michael worked on — including correspondence with members of the American Federation of Information Processing Societies (AFIPS) regarding Michael's roles in the organization and his potential authorship of articles for the Annals of the History of Computing. This series is arranged alphabetically by folder title.


Personal correspondence, photographs, and clippings 1969-1982