



Smithsonian Institution Archives

## DNA Sequencing Videohistory Collection, 1989-1990

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## Collection Overview

<b>Repository:</b>	Smithsonian Institution Archives, Washington, D.C., <a href="mailto:osiaref@si.edu">osiaref@si.edu</a>
<b>Title:</b>	DNA Sequencing Videohistory Collection
<b>Identifier:</b>	Record Unit 9549
<b>Date:</b>	1989-1990
<b>Extent:</b>	5 videotapes (Reference copies). 22 digital .wmv files and .rm files (Reference copies).
<b>Creator::</b>	
<b>Language:</b>	English

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## Administrative Information

### Preferred Citation

Smithsonian Institution Archives, Record Unit 9549, DNA Sequencing Videohistory Collection

### Use Restriction

Restricted. The permission of Ramunas Kondratas must be obtained before the public broadcast or public viewing of the tapes. Contact [SIHistory@si.edu](mailto:SIHistory@si.edu) for more details.

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## Historical Note

DNA is composed of the four individual nucleotides: adenine (A), thymine (T), cytosine (C), and guanine (G). To decipher a particular piece of DNA, it is necessary to determine the exact sequence of these nucleotides. The sequence of the nucleotides determines the genetic information encoded in a DNA strand. A partial nucleotide sequence for a human gene might look like: GGCCTGACTCTCTC. In 1977, biochemist Fred Sanger developed the enzymatic chain termination procedure that allowed for sequencing of individual strands of DNA. This made mapping and sequencing of genetic material possible.

In 1986, Leroy E. Hood's Laboratory at the California Institute of Technology (Cal Tech) announced its development of a semiautomated machine for sequencing DNA. The machine automated the enzymatic chain termination procedure for DNA sequence analysis developed by Sanger and became a key instrument in mapping and sequencing genetic material. That same year, Applied Biosystems, Inc. (ABI) produced the first commercial instruments for clinical use. Constant improvements in the technology resulted in faster sequencing capacity, which was significant for advanced scientific research in projects such as mapping the human genome.

Leroy E. Hood received his M.D. from The Johns Hopkins School of Medicine in 1964, and a Ph.D. in immunology from Cal Tech in 1968. From 1968 until 1970 he held a postdoctoral fellowship at the National

Institutes of Health. In 1970 he was appointed professor of biology at Cal Tech and eventually became chairman of the Division of Biology and the director of its cancer center.

Michael Hunkapiller received a Ph.D. in chemistry from Cal Tech in 1974. He joined ABI as its vice president for research and development in 1983.

Robert J. Kaiser received his Ph.D in chemistry from Cal Tech in 1983, and subsequently joined the Cal Tech staff as a research fellow in biology. Jane Z. Sanders joined the Cal Tech staff in 1984 as an associate biologist and was appointed senior biologist a year later. She took graduate courses in biochemistry in 1971-1972 at the Stanford University Medical School.

Lloyd M. Smith received a Ph.D. in biophysics from Stanford University in 1981, and was a senior research fellow in biology at Cal Tech from 1982 until 1987, when he was appointed assistant professor in the Analytical Division of the Department of Chemistry at the University of Wisconsin-Madison.

J. Craig Venter received his Ph.D. in physiology and pharmacology from the University of California, San Diego in 1975. In 1983 he was appointed adjunct professor of biochemical pharmacology at the State University of New York-Buffalo and joined NIH in 1984 as chief of the Receptor Biochemistry and Molecular Biology Section, NINDS. In 1987 he also became co-director of the Laboratory of Molecular and Cellular Neurobiology, NINDS, NIH and was appointed director of the NINDS DNA facility at NIH.

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## Introduction

The Smithsonian Videohistory Program, funded by the Alfred P. Sloan Foundation from 1986 until 1992, used video in historical research. Additional collections have been added since the grant project ended. Videohistory uses the video camera as a historical research tool to record moving visual information. Video works best in historical research when recording people at work in environments, explaining artifacts, demonstrating process, or in group discussion. The experimental program recorded projects that reflected the Institution's concern with the conduct of contemporary science and technology.

Smithsonian historians participated in the program to document visual aspects of their on-going historical research. Projects covered topics in the physical and biological sciences as well as in technological design and manufacture. To capture site, process, and interaction most effectively, projects were taped in offices, factories, quarries, laboratories, observatories, and museums. Resulting footage was duplicated, transcribed, and deposited in the Smithsonian Institution Archives for scholarship, education, and exhibition. The collection is open to qualified researchers.

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## Descriptive Entry

Ramunas Kondratas, curator at the Smithsonian's National Museum of American History (NMAH), was interested in documenting the history, development, and applications of the DNA Sequencer. He also explored the commercialization of the instrument, including its testing and marketing, and addressed current and future uses of the ABI 370A model sequencer in medical research. Sessions were recorded at California Institute of Technology in Pasadena, California, on October 19, 1988, at Applied Biosystems, Inc., in Foster City, California, on October 21, 1988, and at the National Institutes of Health (NIH) in Washington, D.C., on March 27, 1990.

Interviewees included scientists and technicians at Cal Tech, ABI, and NIH. Jeannine Gocayne received a M.A. in molecular biology from the State University of New York-Buffalo in 1985 and was appointed a biologist and sequencing supervisor with the Receptor Biochemistry and Molecular Biology Section of the

Laboratory of Molecular and Cellular Neurobiology, National Institute of Neurological Disorders and Stroke (NINDS), NIH in 1986.

Several others provided additional information about the sequencer for the three video sessions. These people included: Kurt Becker, DNA Sequencing Product Manager; Kip Connell, research scientist; Marilee Shaffer, products specialist for DNA sequencing, ABI; and Anthony R. Kerlavage and W. Richard McCombie of the Receptor Biochemistry and Molecular Biology Section of the Laboratory of Molecular and Cellular Neurobiology, NINDS, NIH.

Session one took place at the California Institute of Technology with Hood, Sanders, and Kaiser. Interviews focused on the history, design, and development of the sequencer prototype and its operation.

Session Two took place at Applied Biosystems, Inc., with Hunkapiller, Becker, Connell, and Shaffer and dealt with the commercial design, fabrication, and marketing of the sequencer and other related instrumentation. Tours of the assembly and manufacturing areas were included in the session, as well as a demonstration of how the DNA sequencing data is represented graphically on a computer.

Session Three took place at the Receptor Biochemistry and Molecular Biology Section of the Laboratory of Molecular and Cellular Neurobiology, NINDS, NIH, where Venter explained and demonstrated the automated DNA sequencing processes during a tour of the lab. Kerlavage and McCombie assisted during the tour. Finally, Gocayne described the application of new DNA sequencing technology to work in the lab.

This collection consists of three interview sessions, totaling approximately 8:40 hours of recordings and 176 pages of transcript.

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## Names and Subject Terms

This collection is indexed in the online catalog of the Smithsonian Institution under the following terms:

### Subjects:

- DNA -- Analysis
- Interviews
- Laboratories
- Molecular biology
- Nucleic acids -- Analysis
- Nucleotide sequence
- Nucleotides -- Analysis
- Oral history
- Science -- History
- Sequence alignment (Bioinformatics)
- Technology -- History

### Types of Materials:

- Transcripts
- Videotapes

### Names:

- Smith, Lloyd M., 1954-
- Applied Biosystems, Inc.
- Becker, Kurt
- California Institute of Technology
- Connell, Kip

Gocayne, Jeannine, ?-2014  
Hood, Leroy E.  
Hunkapiller, Michael  
Kaiser, Robert J.  
Kerlavage, Anthony R.  
Kondratas, Ramunas A., interviewer  
McCombie, W. Richard (William Richard)  
National Institutes of Health (U.S.)  
Schaffer, Marilee  
Venter, J. Craig

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## Container Listing

### Interviews

Interviews                    **Session 1: October 19, 1988**

Interviews                    Was recorded at Church Laboratory, Cal Tech, Pasadena, California. Hood, Kaiser, and Sanders discussed the history and development of the prototype DNA sequencer and ABI 370A, and activities in the lab, c. 1970s-1988, including: Demonstration of the prototype DNA sequencer; history and development of the DNA sequencer; commercial aspects of the DNA sequencer; ethics of genetic engineering; future impact of DNA sequencer on medical science; biographical information on Hood; description of chemical component of the DNA sequencer; demonstration of DNA preparation for sequencing; and biographical information on Sanders. Visual documentation included: Prototype DNA sequencer; laboratory; and instrumentation.

Interviews                    Transcript, 1-69 pages, of videotape recording, 3 hours, 40 minutes.

Interviews                    Video Recordings of Interviews: Total Recording Time:3 hours, 40 minutes

- Note:
- Original Masters: 11 Beta videotapes
  - Preservation Masters: 11 Motion jpeg 2000 and 11 mpeg digital files
  - Dubbing Masters: 11 U-matic videotapes
  - Reference Copies: 2 VHS videotapes, 11 Windows Media Video and 11 Real Media digital files

Interviews                    **Session 2: October 21, 1988**

Interviews                    Was recorded in the manufacturing and testing areas, and office areas of Applied Biosystems, Inc., Foster City, California. Becker, Connell, Hunkapiller, Shaffer, and Smith discussed the assembly of the ABI 370A DNA sequencer and its commercial applications, c. 1986-1989, including: History and development of the ABI 370A; collaboration with California Institute of Technology; comparison of prototype DNA sequencer and ABI 370A; commercial implications of DNA sequencing; tour of manufacturing area; demonstration of ABI 370A sequencing DNA; data analysis computer; ABI's marketing strategy; and ABI's role in the international biotechnological industry. Visual documentation included: Manufacturing plant; computer images; and instrumentation.

Interviews                    Transcript, 1-58 pages, of videotape recording, 3 hours, 12 minutes.

Interviews                    Video Recordings of Interviews: Total Recording Time: 3 hours, 12 minutes

- Note:
- Original Masters: 9 Beta videotapes

- Preservation Masters: 9 Motion jpeg 2000 and 9 mpeg digital files
- Dubbing Masters: 9 U-matic videotapes
- Reference Copies: 2 VHS videotapes, 9 Windows Media Video and 9 Real Media digital files

Interviews **Session 3: March 27, 1990**

Interviews Was recorded at The Receptor Biochemistry and Molecular Biology Section of the Laboratory of Molecular and Cellular Neurobiology, NINDS, NIH, Rockville, Maryland. Venter, Kerlavage, McCombie, and Gocayne discuss the role of the prototype DNA sequencer and the ABI 370A within their lab, c. 1986-1989, including: Tour and narration of the various areas of the lab; demonstration of lab techniques; biographical information on Venter; demonstration of the Hewlett-Packard Vectra and Macintosh IIci computers; discussion of instrumentation in medical research; discussion of the Human Genome Project; and discussion of robotics. Visual documentation included: Computers and instrumentation.

Interviews Transcript, 1-49 pages, of videotape recording, 2 hours.

Interviews Video Recordings of Interviews: Total Recording Time: 2 hours

- Note:
- Original Masters: 6 Beta videotapes
  - Preservation Masters: 6 Motion jpeg 2000 and 6 mpeg digital files
  - Dubbing Masters: 2 U-matic videotapes
  - Reference Copies: 1 VHS videotape, 2 Windows Media Video and 3 Real Media digital files