CHEMICAL HERITAGE FOUNDATION

# LLOYD M. SMITH

Transcript of an Interview
Conducted by

David C. Brock and Richard Ulrych

at

New Orleans, Louisiana

on

2 March 2008

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION
Oral History Program
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**LLOYD M. SMITH**

1954 Born in Berkeley, California, on 3 October

## Education

1976 B.A., Biochemistry, University of California, Berkeley
1981 Ph.D., Biophysics, under Harden M. McConnell, Stanford University

## Professional Experience

Stanford University
1981 Postdoctoral Fellow, under Harden M. McConnell
1981-1982 Lecturer, Chemistry

California Institute of Technology
1982-1985 Postdoctoral Research Fellow
1985-1987 Senior Research Fellow, Division of Biology, under Leroy Hood

University of Wisconsin, Madison
1987-1992 Assistant Professor, Analytical Sciences Division, Department of Chemistry
1992-1995 Associate Professor, Analytical Sciences Division, Department of Chemistry
1995-present Professor, Analytical Sciences Division, Department of Chemistry
1999-2001 Chair, Analytical Sciences Division, Department of Chemistry
2001-present Director Genome Center
2003-2004 Chair, Analytical Sciences Division, Department of Chemistry
2006-2010 Chair, Analytical Sciences Division, Department of Chemistry

## Honors

1977-1981 NIH Pre-Doctoral Trainee
1982-1985 NIH Post-Doctoral Trainee
1985 Chosen as one of Science Digest's Top 100 Innovators
1989-1991 Eli Lilly Analytical Chemistry Award
1989-1994 NSF Presidential Young Investigator Award
1994 Kazusa DNA Research Institute, Japan, Inaugural Speaker
1994-1999 H. I. Romnes Faculty Fellowship, University of Wisconsin-Madison

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| 1997 | Association of Biomolecular Resource Facilities Award for Development of Automated DNA Sequencing |
| 1999-2004 | WARF Kellett Mid-Career Faculty Researcher Award, University of Wisconsin-Madison |
| 2003-2008 | John D. MacArthur Professorship, University of Wisconsin-Madison |
| 2005 | American Chemical Society Award in Chemical Instrumentation |
| 2008-2010 | Vilas Associate Award |
| 2008 | Jay Goodwin Lecturer, Auburn University |
| 2009-present | Member, Faculty of 1000 |
| 2009 | W. L. Hubbell Professor of Chemistry |
| 2010 | American Association for the Advancement of Science Fellow |
| 2010 | Pittsburgh Analytical Chemistry Award |

## ABSTRACT

**Lloyd M. Smith** grew up in Berkeley, California, one of four children. His father was a physicist at Lawrence Berkeley National Laboratory and his mother a professor of mathematics. Lloyd attended the Berkeley public schools, which he says were excellent. He developed no overwhelming interest in any of the sciences until he was a student at University of California, Berkeley. There he liked biology, chemistry and physics and chose to major in biochemistry. He worked in Wayne Hubbell's lab, studying membranes and synthetic chemistry. On Hubbell's advice he enrolled in graduate school at Stanford University, entering Harden McConnell's lab to work on diffusion in membranes, obtaining his PhD in biophysics and publishing nine papers. Now interested in instrumentation and in immunology, he accepted a postdoc with Leroy Hood at the California Institute of Technology. During months of sequencing he thought up the first fluorescence-based automated DNA sequencing instrument, thus combining his love of physics with his love of biology and chemistry.

Working with Michael Hunkapiller on commercialization of his technology, he became a consultant for Applied Biosystems (ABI), learning first-hand of the complications of relationships between academia and industry. With what became the seminal paper describing his work accepted for publication in the journal *Nature*, he spent several weeks in Europe.

Smith accepted an assistant professorship at the University of Wisconsin, eventually becoming Director of the Genome Center and Chair of the Analytical Sciences Division in the Department of Chemistry. There Smith developed another laser system for sequence analysis and began the use of matrix-assisted laser desorption/ionization (MALDI) on nucleic acids. He also founded his own company, Third Wave Technologies. He discusses such new methods as array technology; gene expression chips and Affymetrix; pyrosequencing; electrospray; and proteomics. He explains how parallelism has enhanced Moore's Law, and the roles of computers and lasers as drivers of all these innovations. He revels in the confluence of instrumentation, chemistry, and computation. Though he acknowledges that informatics is now required to make sense of the huge volumes of data enabled by technology, he emphasizes the continuing need for thinking

## INTERVIEWERS

**David C. Brock** is a senior research fellow with the Center for Contemporary History and Policy at the Chemical Heritage Foundation. As a historian of science and technology, he specializes in the history of semiconductor science, technology, and industry; the history of instrumentation; and oral history. Brock has studied the philosophy, sociology, and history of science at Brown University, the University of Edinburgh, and Princeton University.

In the policy arena Brock recently published *Patterning the World: The Rise of Chemically Amplified Photoresists*, a white-paper case study for the Center's Studies in Materials Innovation. With Hyungsub Choi he is preparing an analysis of semiconductor technology roadmapping, having presented preliminary results at the 2009 meeting of the Industry Studies Association.

**Richard Ulrych** is the director of institutional grants and strategic projects at the Chemical Heritage Foundation.

## TABLE OF CONTENTS

## INDEX