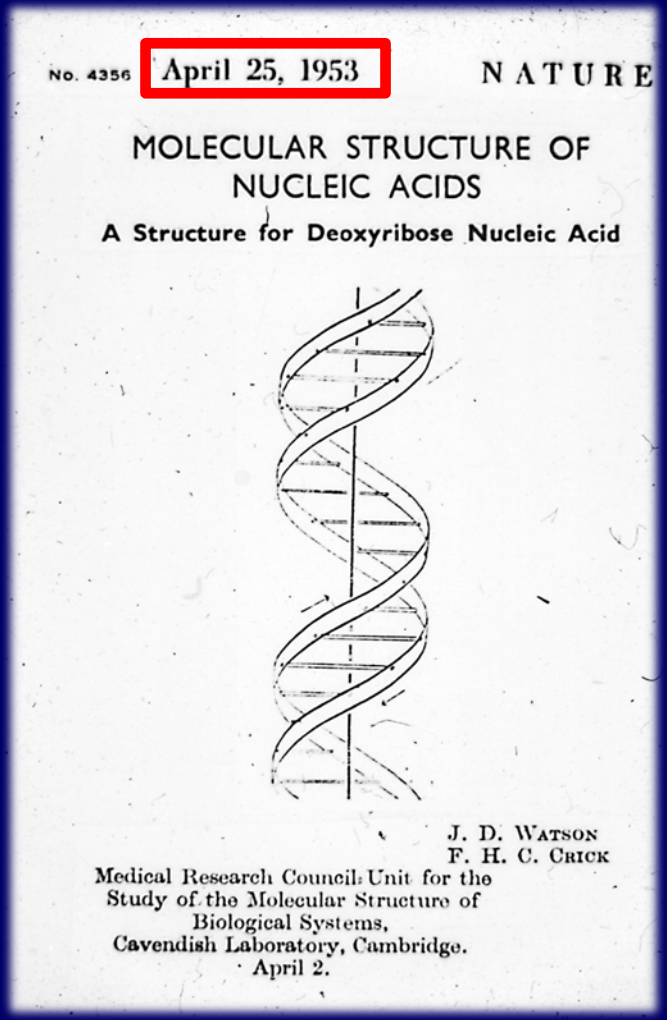
The Genomics Landscape a Decade after the Human Genome Project

Special Symposium

Ruth L. Kirschstein Auditorium
Natcher Conference Center
National Institutes of Health

April 25, 1953



No. 4356 April 25, 1953 NATURE

MOLECULAR STRUCTURE OF NUCLEIC ACIDS

A Structure for Deoxyribose Nucleic Acid

J. D. Watson
F. H. C. Crick

Medical Research Council Unit for the Study of the Molecular Structure of Biological Systems, Cavendish Laboratory, Cambridge.

April 2.

Discovery of Double-Helical Structure of DNA

April 14, 2003

National Human Genome Research Institute

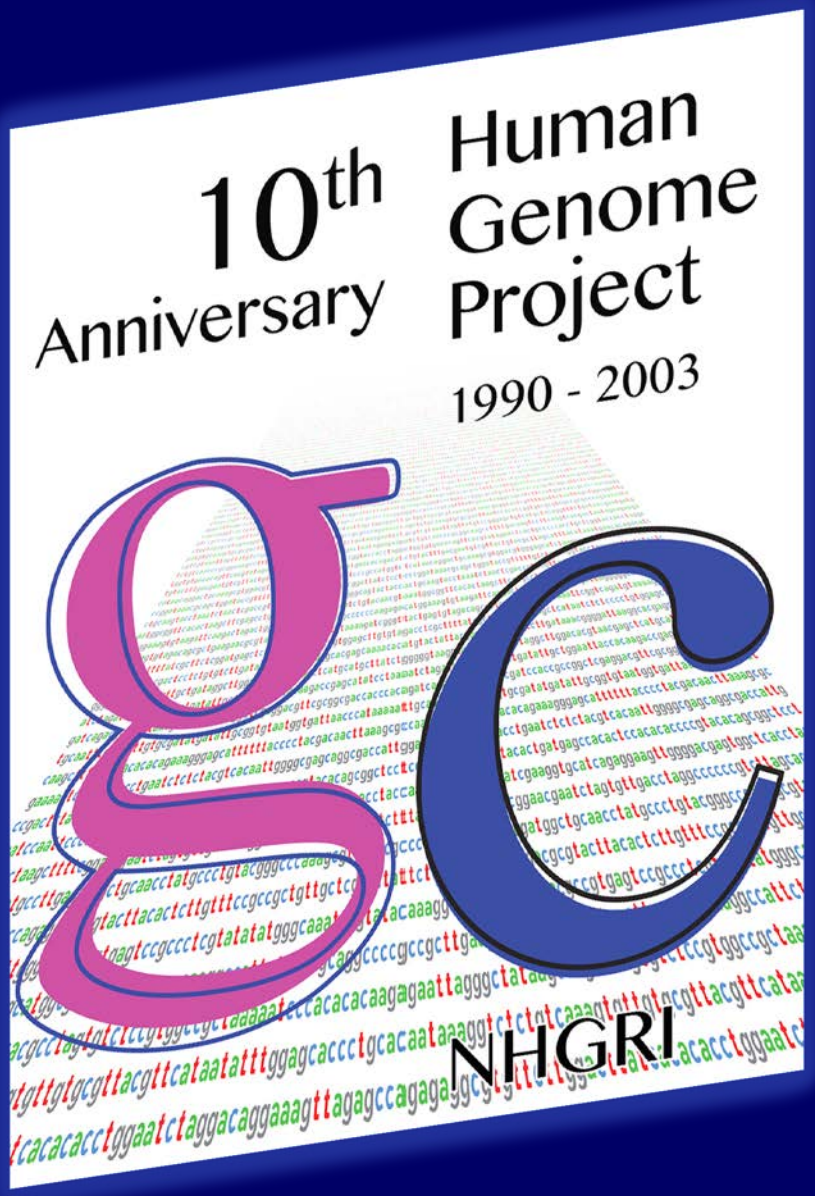
National Institutes of Health
U.S. Department of Health and Human Services

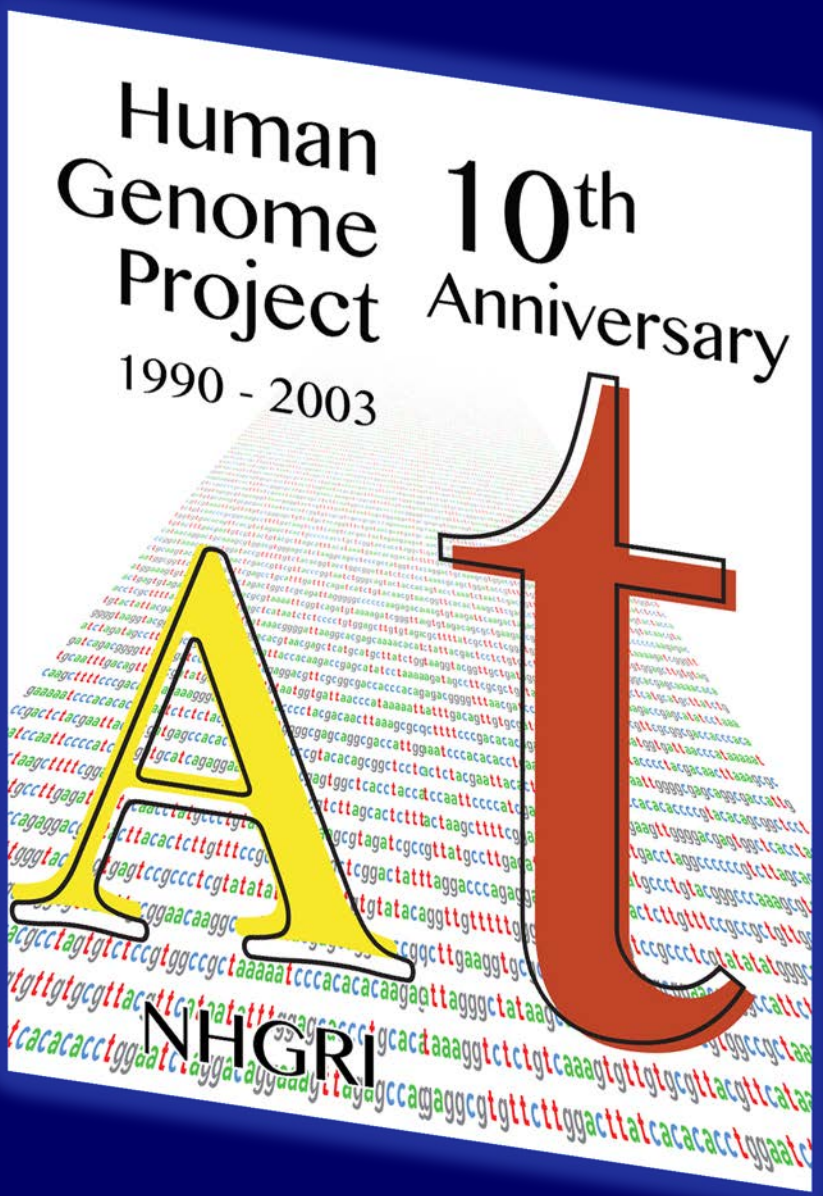
National Human Genome Research Institute
National Institutes of Health
Department of Health and Human Services
and
Office of Science
U.S. Department of Energy

International Consortium Completes Human Genome Project

All Goals Achieved; New Vision for Genome Research Unveiled

BETHESDA, Md., April 14, 2003 - The International Human Genome Sequencing Consortium, led in the United States by the National Human Genome Research Institute (NHGRI) and the Department of Energy (DOE), today announced the successful completion of the Human Genome Project more than two years ahead of schedule.


10th
Anniversary
Human
Genome
Project
1990 - 2003
NHGRI


Human
Genome
Project
1990 - 2003
10th
Anniversary
NHGRI

Milestones in Genomics

1990

HGP Begins

2003

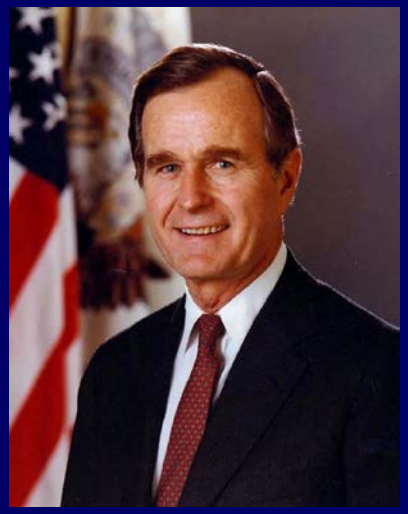
HGP Ends

2013

10 Years after HGP

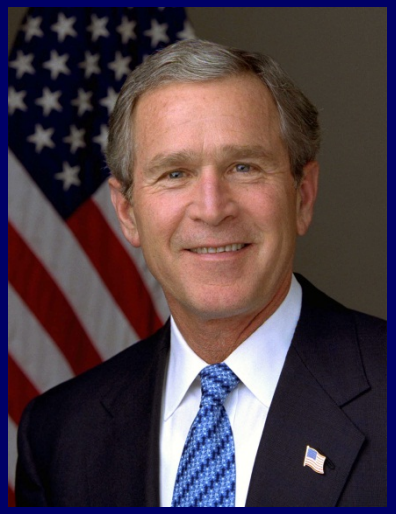
U.S. Presidents

1990



Bush #1

2003

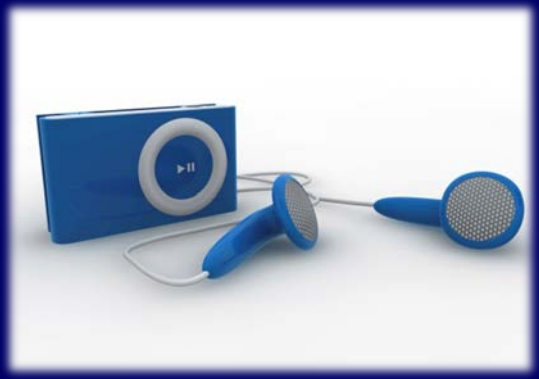


Bush #2

2013

Obama

Music Devices

1990	2003	2013
		
Walkman	Discman	MP3 Player

Computer Devices

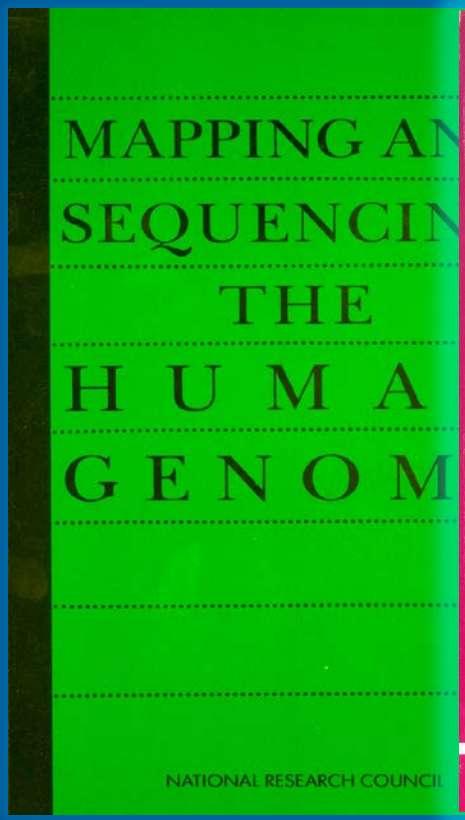
1990	2003	2013
		
Desktop	Laptop	Smartphone

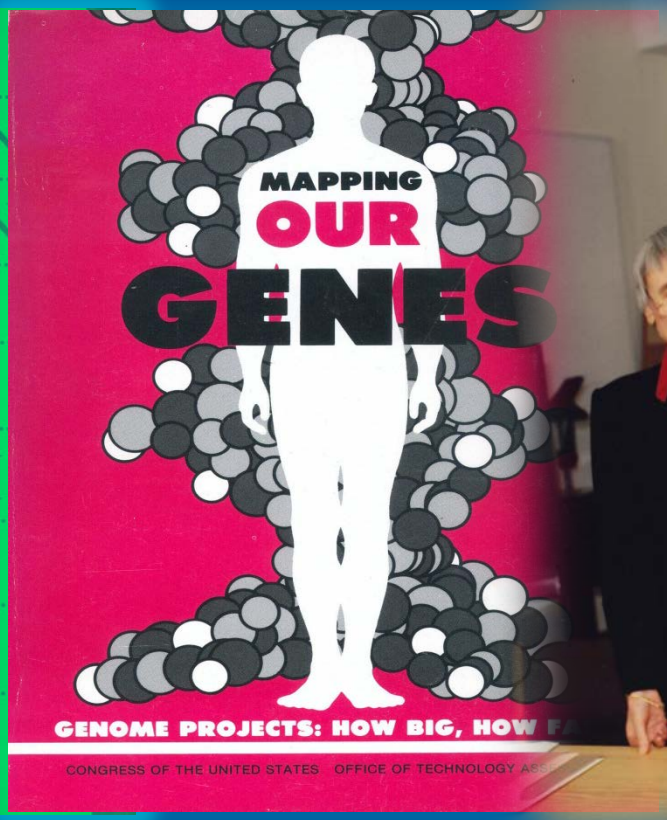
Routine Communication

1990	2003	2013
		
Fax	E-mail	Tweet

Different Eras for Genomics & NHGRI

1990



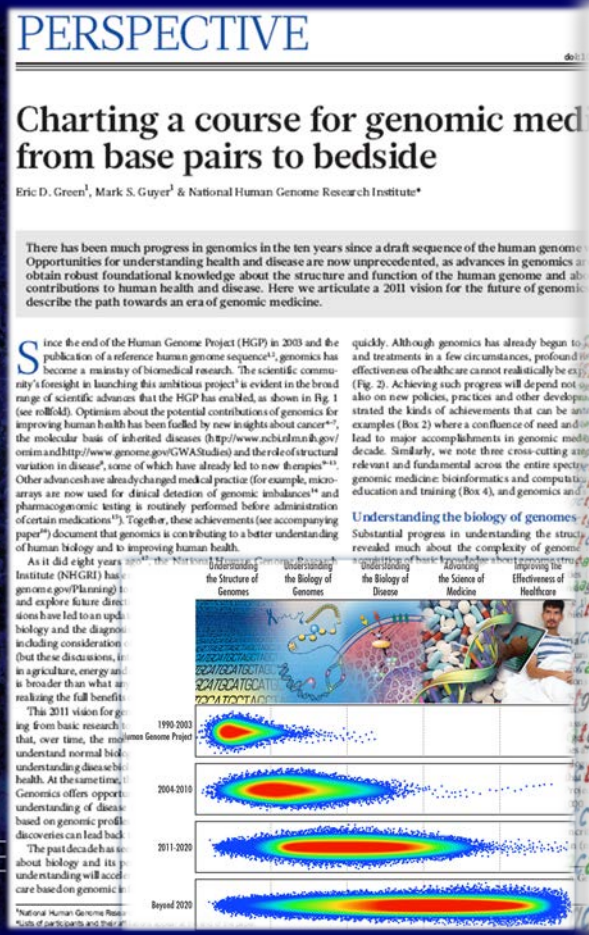


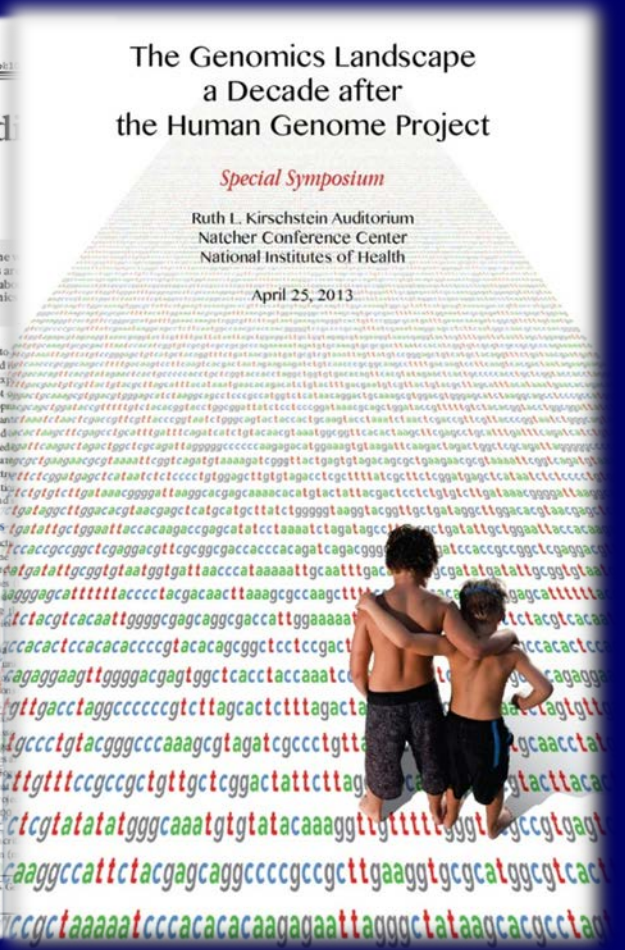
Different Eras for Genomics & NHGRI

2003

Different Eras for Genomics & NHGRI

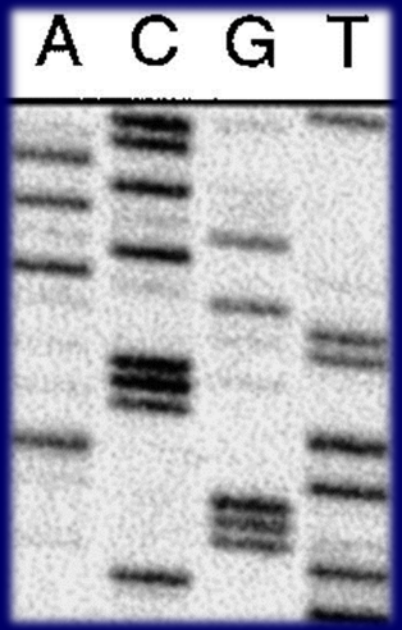
2013



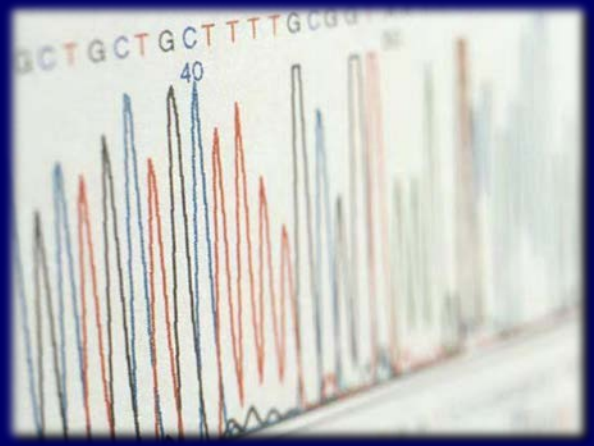


DNA Sequencing Technology

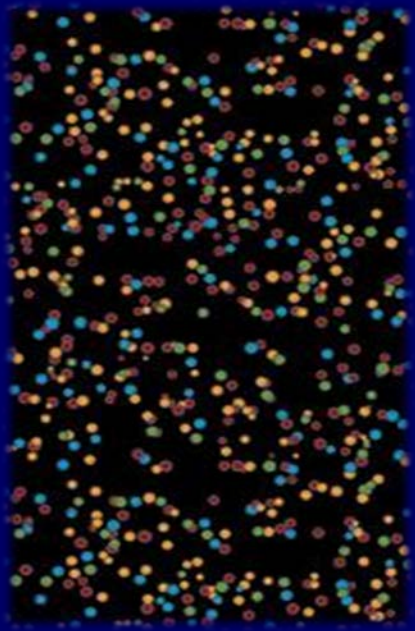
1990



2003



2013



Human Genome Sequences

1990	2003	2013
Time to Generate a Human Genome Sequence		
~6-8 years	~3-4 months	~2-3 days
Cost to Generate a Human Genome Sequence		
~$1B	~$10-50M	~$4-6K
Generated Human Genome Sequences		
0	1	Thousands

Genome Sequences

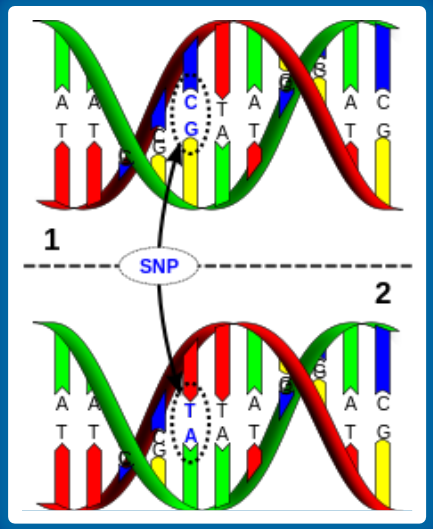
	1990	2003	2013
Vertebrate Genome Sequences	0	3	112
Non-Vertebrate, Eukaryotic Genome Sequences	0	14	455
Prokaryotic Genome Sequences	0	167	8760

Genome Sequence Data

1990	2003	2013
Total DNA Bases in GenBank		
~49M	~31T	~150T
Whole-Genome Shotgun Bases in GenBank		
0	~9.6T	~391T

Human Single-Nucleotide Polymorphisms in Public Databases

1990	2003	2013
~4.4K	~3.4M	~54M



Rare Genetic Diseases

1990	2003	2013
No. Diseases with Known Molecular Basis		
61	2264	4847
No. Genes with Known Disease-Causing Mutations		
53	1474	2972

Common Genetic Diseases

1990	2003	2013
No. Published Genome-Wide Association Studies (GWAS)		
0	0	~1550
No. Replicated Disease-Associated Variants		
0	6	~2900

Drugs with Pharmacogenomics Information on Label

1990	2003	2013
4	46	106

The Changing Genomics Landscape

1990

2003

2013

Rudy Pozzatti & Brad Ozenberger (Co-Chairs)
Annette Sante (All Things Logistic)
Darryl Leja (Graphics Extraordinaire)
Larry Thompson &Team (Videography)

Jessica Barry
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Larry Brody
Adam Felsenfeld
Allison Mandich
Derek Scholes

Barbara Biesecker
Joy Boyer
Priscilla Crockett
Lucia Hindorff
Bill Pavan
Kris Wetterstrand

NHGRI-Smithsonian Partnership

NIH National Human Genome Research Institute

Smithsonian
National Museum of Natural History

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