FIRST PRINCIPLE CALCULATIONS OF DEFECT STRUCTURES IN ZINC OXIDE

By

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A thesis submitted in partial fulfillment of
the requirements for the degree of

BACHELOR OF SCIENCE

UNIVERSITY OF THE PHILIPPINES - DILIMAN
National Institute of Physics

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To the Faculty of University of the Philippines Diliman National Institute of Physics:

The members of the Committee appointed to examine the thesis of CHRISTIAN LOER T. LLEMIT find it satisfactory and recommend that it be accepted.

Roland V. Sarmago, Ph.D., Chair

Donald Trump, Ph.D.

Rodrigo Duterte, Ph.D.

ACKNOWLEDGMENT

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FIRST PRINCIPLE CALCULATIONS OF DEFECT STRUCTURES

IN ZINC OXIDE

Abstract

by Christian Loer T. Llemit, BS
University of the Philippines - Diliman
May 2020

: Roland V. Sarmago

Nullam mollis et leo at pharetra. Nulla efficitur molestie euismod. Sed dapibus metus sed tempus varius. Aenean finibus eros ut urna luctus feugiat. Duis turpis risus, viverra vitae porta et, ullamcorper ac est. Proin in eros nec ipsum interdum tempus. Nam fringilla lectus velit, non posuere ex vehicula ut. Mauris tincidunt, dolor sit amet commodo tempor, erat mi egestas dui, at elementum tellus est rhoncus libero. Ut et rutrum lectus, id viverra tortor. Vivamus nec lacus eros. Donec dictum porta nisi et vestibulum. Mauris luctus ligula ut libero aliquet luctus. Quisque malesuada egestas finibus.

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This dissertation/thesis is dedicated to my mother and father who provided both emotional and financial support

Chapter One

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1.3 Defects in Semiconductors

1.4 ZnO

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1.4.1 Subsection of section - double quotes

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1.4.2 Another subsection of section - citations

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This is sample text

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Example of double quotes “word”. Lore

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4.1 Some Math Stuff

LaTeX has a special way to embed mathematical symbols and notations. Here are some of them. Also observe how a bullet list is made.

- greater than $\geq$
- less than $\leq$
- percent sign $\%$
- multiply $N \times N$
- inline equation $M = N(N-1)/2$

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4.2 Math equation

Example of a mathematical formula:

$$ADD = \sum_{i=1}^{M} | < D(n+1, i) > - < D(n, i) > | \tag{4.1}$$

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4.3 Chapter section

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Chapter Five

FIGURES AND TABLES

5.1 Examples of a figure

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Example of a figure. Example of reference to a figure in the text (Fig. 5.1). Phasellus dolor neque, vehicula vestibulum semper at, facilisis eget libero. Mauris interdum magna molestie, auctor felis a, condimentum odio. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Suspendisse maximus lacinia dignissim. Maecenas pharetra accumsan metus, sagittis dictum purus sollicitudin eget. Curabitur ut porttitor arcu, ut porttitor ipsum. Vestibulum porttitor finibus sapien, ac pharetra odio bibendum nec. Nullam tincidunt dignissim risus imperdiet dictum.

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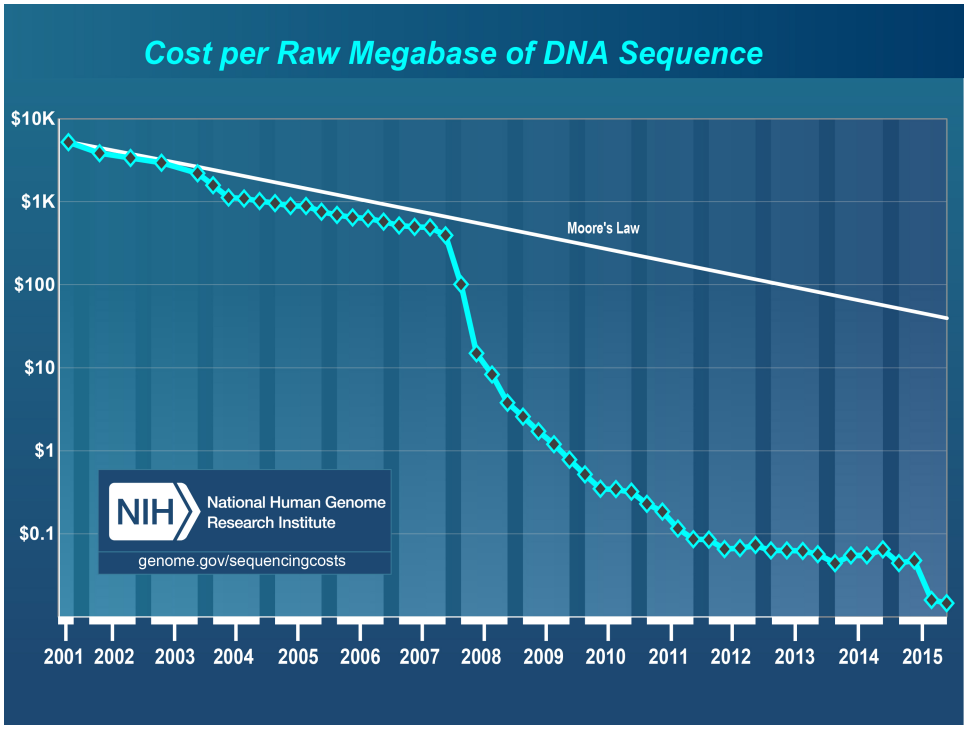

Figure 5.1 Cost per raw megabase of DNA sequence from 2001 to 2015. Straight line - Moore's Law, blue curve - cost in US dollars, Y-axis scale is logarithmic. Graph reproduced from [5]

5.2 Example of a table

Example of a table and here is the reference to Table 5.1. Tables in, my opinion, are the hardest thing to make.

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Organism	Accession no.	Genome size (bp)	No. CDS
Mesorhizobium loti	NC_002678	7036071	6743
Sinorhizobium meliloti	NC_003047	3654135	3359
Bradyrhizobium japonicum	NC_004463	9105828	8317
Rhodopseudomonas palustris	NC_005296	5459213	4813
Bartonella quintana	NC_005955	1581384	1142
Bartonella henselae	NC_005956	1931047	1488
Rickettsia typhi	NC_006142	1111496	837
Beijerinckia indica	NC_010581	4170153	3569

Table 5.1 Whole-genome sequences used in this study

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APPENDIX

Appendix A

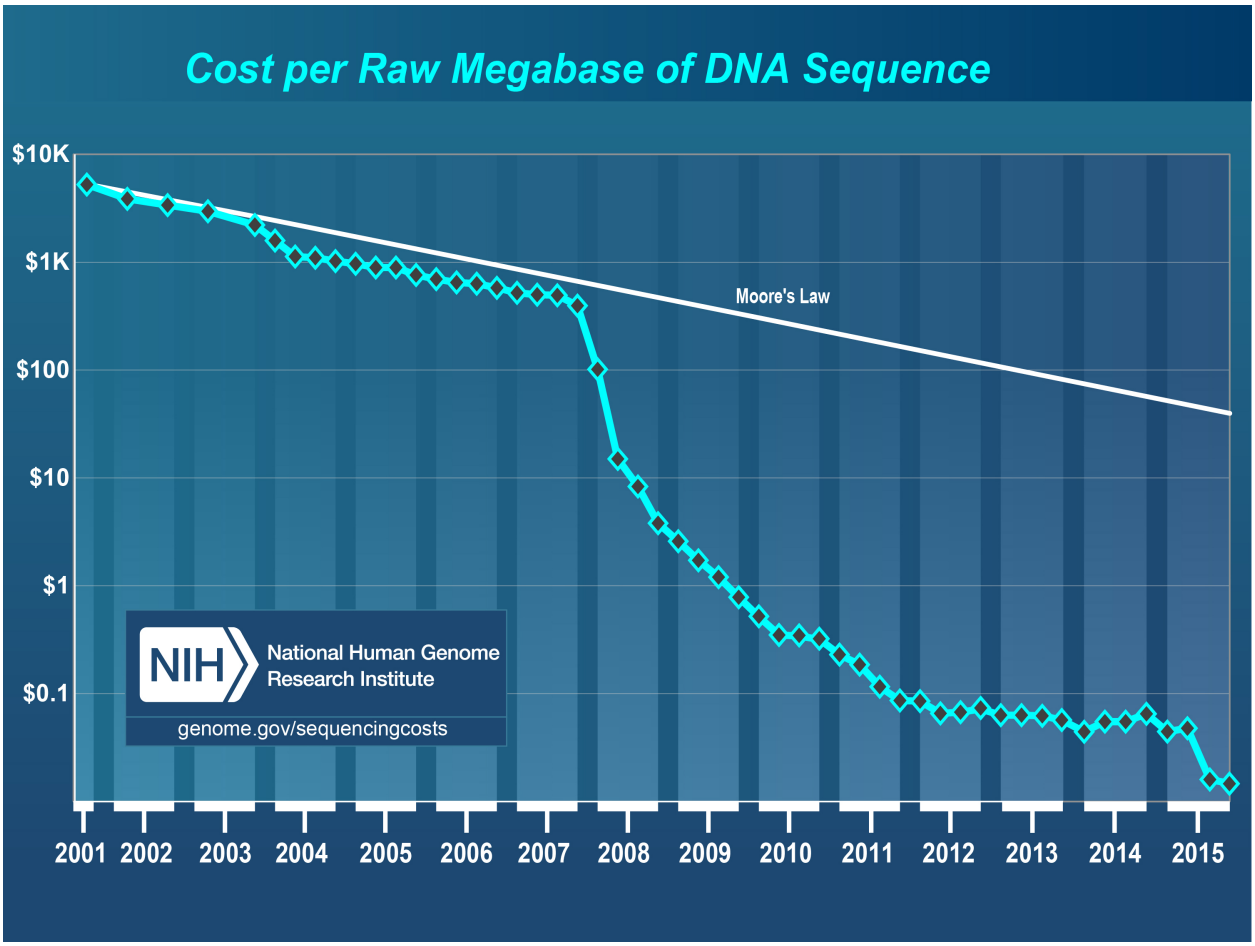

Figure A.1 Cost per raw megabase of DNA sequence from 2001 to 2015. Straight line - Moore's Law, blue curve - cost in US dollars, Y-axis scale is logarithmic. Graph reproduced from [5]

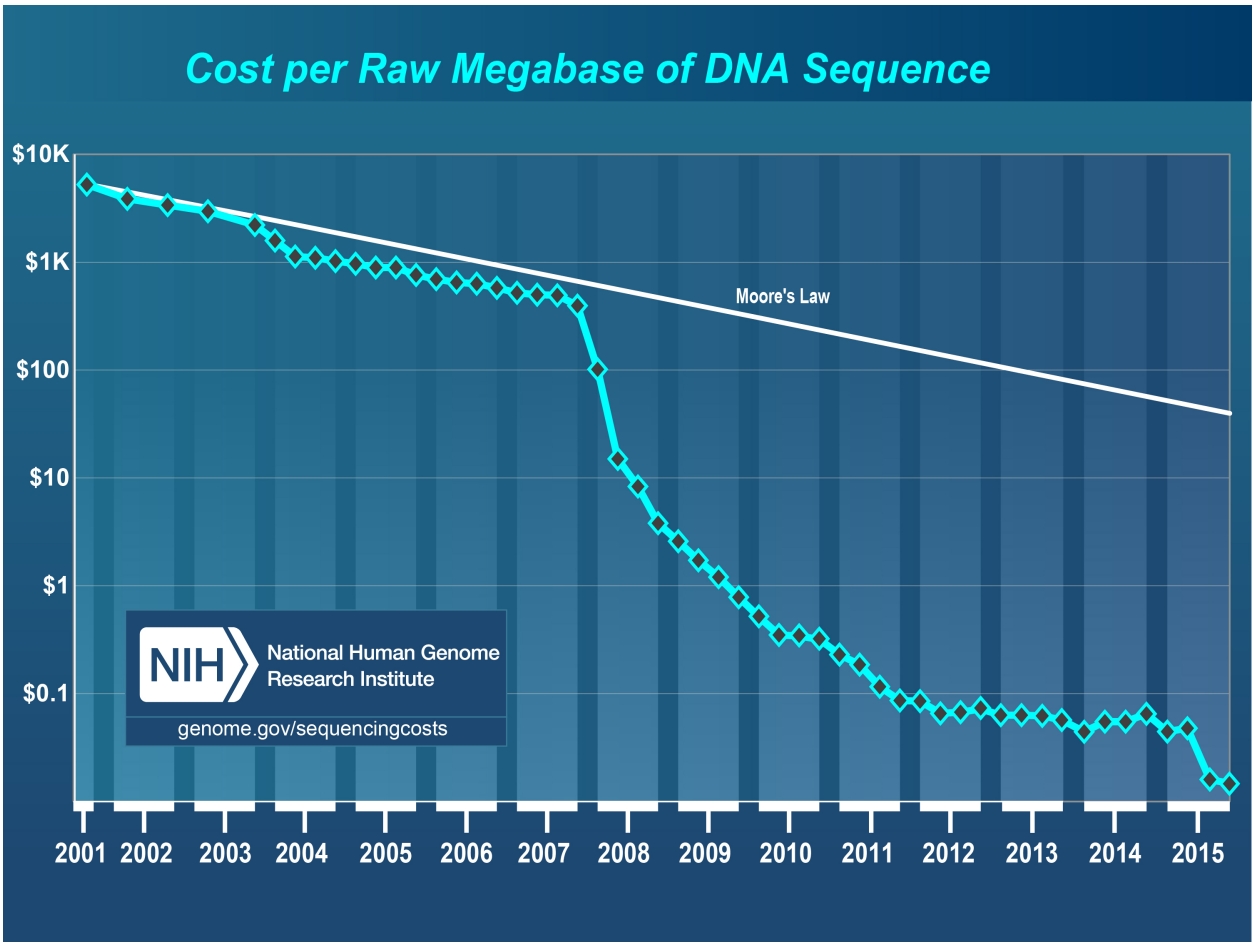

Figure A.2 Cost per raw megabase of DNA sequence from 2001 to 2015. Straight line - Moore's Law, blue curve - cost in US dollars, Y-axis scale is logarithmic. Graph reproduced from [5]

Appendix B

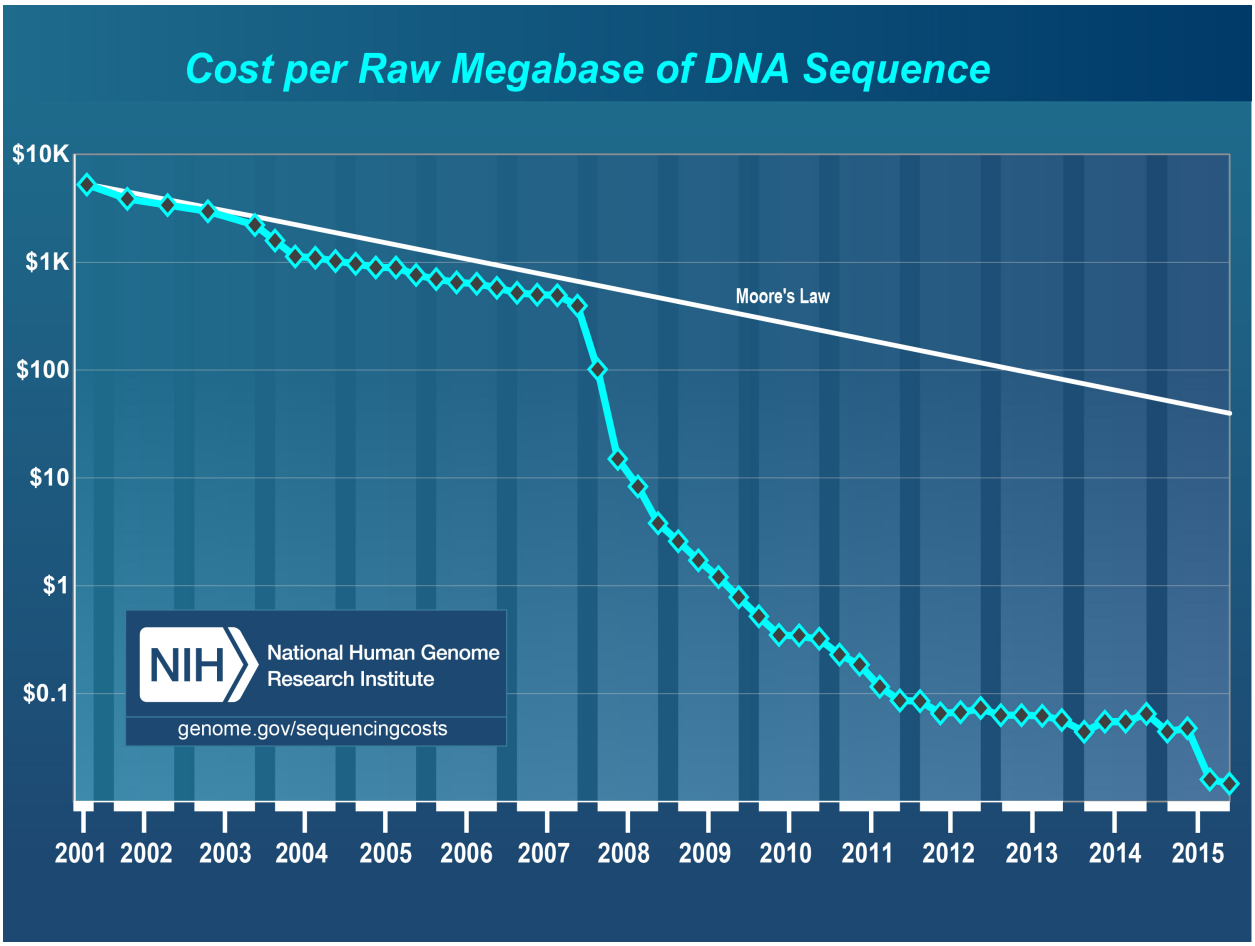

Figure B.1 Cost per raw megabase of DNA sequence from 2001 to 2015. Straight line - Moore's Law, blue curve - cost in US dollars, Y-axis scale is logarithmic. Graph reproduced from [5]

Appendix C

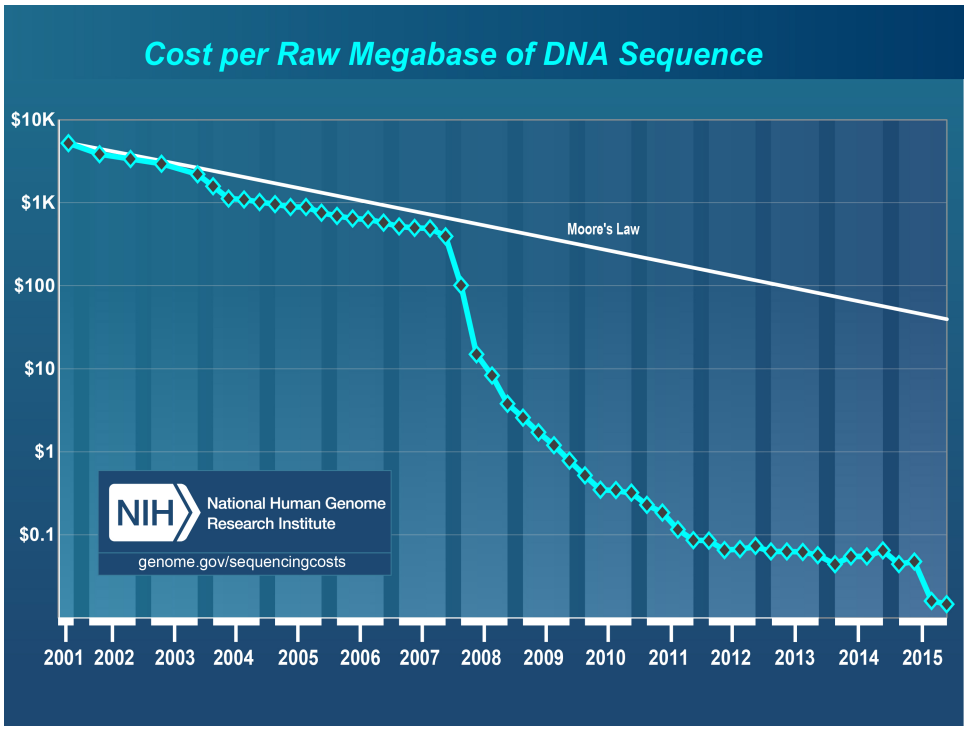

Figure C.1 Cost per raw megabase of DNA sequence from 2001 to 2015. Straight line - Moore's Law, blue curve - cost in US dollars, Y-axis scale is logarithmic. Graph reproduced from [5]

Appendix D

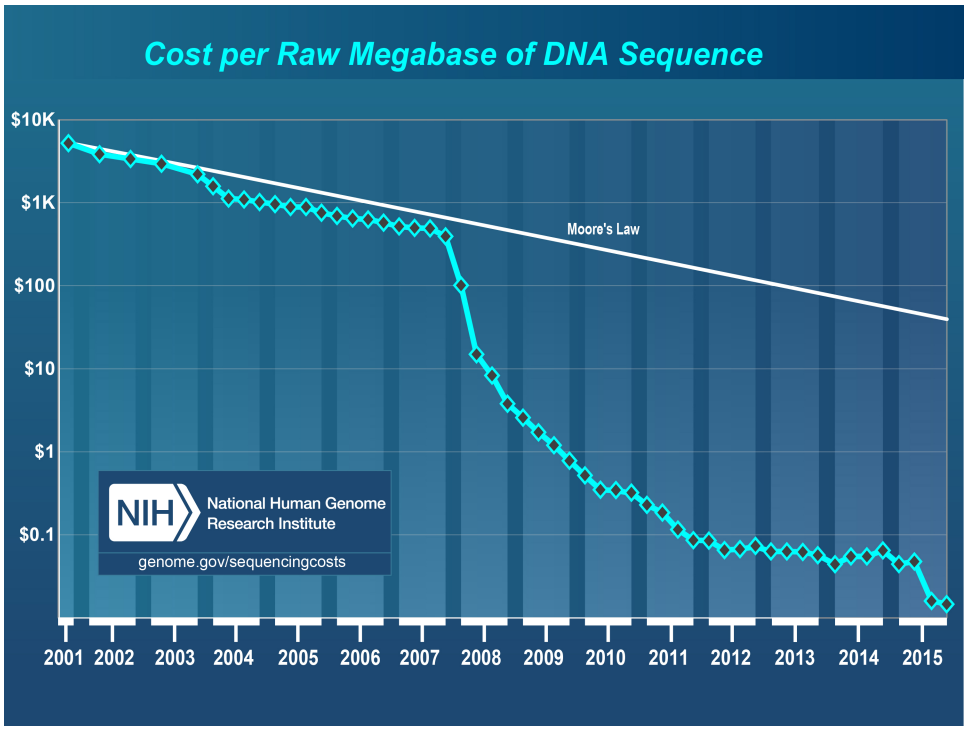

Figure D.1 Cost per raw megabase of DNA sequence from 2001 to 2015. Straight line - Moore's Law, blue curve - cost in US dollars, Y-axis scale is logarithmic. Graph reproduced from [5]

Appendix E

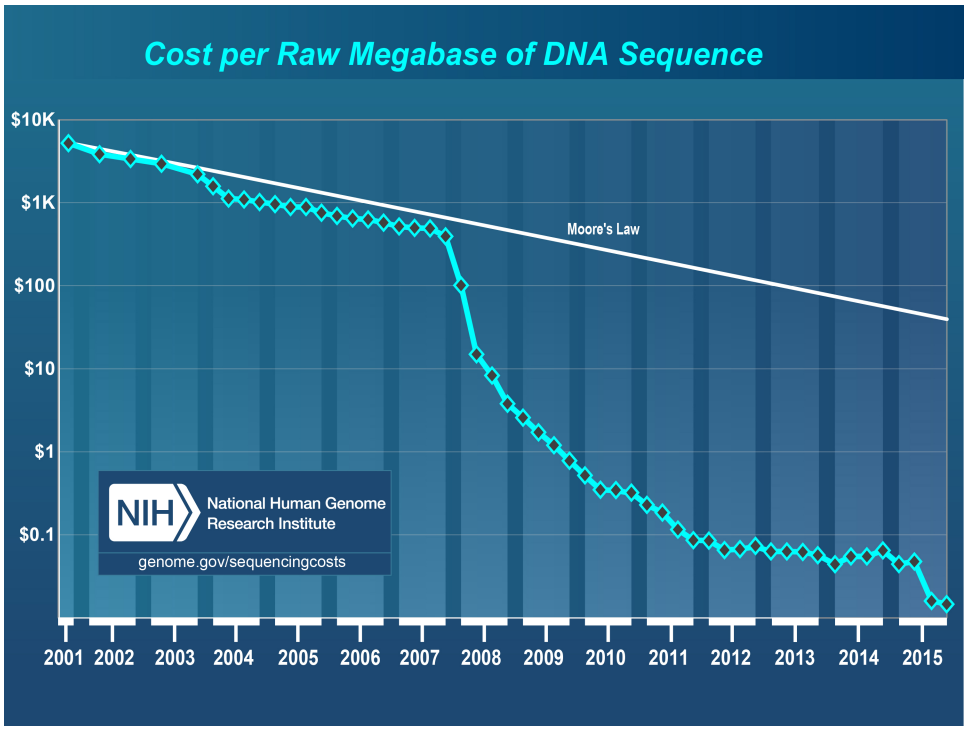

Figure E.1 Cost per raw megabase of DNA sequence from 2001 to 2015. Straight line - Moore's Law, blue curve - cost in US dollars, Y-axis scale is logarithmic. Graph reproduced from [5]