Senate Commerce Committee Nominee Questionnaire
Eric Steven Lander

A. BIOGRAPHICAL INFORMATION AND QUALIFICATIONS

1. Name (Include any former names or nicknames used)

   Eric Steven Lander

2. Position to which nominated

   Director, Office of Science and Technology Policy

3. Date of Nomination

   Jan 20, 2021

4. Address (List current place of residence and office addresses)

   Home: [redacted]
   Office (until January 25, 2021): Broad Institute
   415 Main Street, Cambridge, MA 02142

5. Date and Place of Birth:

   February 3, 1957
   Brooklyn, New York

6. Provide the name, position, and place of employment for your spouse (if married) and the names and ages of your children (including stepchildren and children by a previous marriage).

   Lori Weiner Lander - Self-employed artist
   Jessica Ann Lander - 33
   Daniel Aaron Lander - 29
   David Abraham Lander - 26

7. List all college and graduate degrees. Provide year and school attended.

   Princeton University, Princeton, New Jersey, 1974–1978
   A.B. with highest honors in Mathematics, June 1978
   Oxford University, Oxford, England, 1978–1981
   D. Phil. in Mathematics, January 1981

8. List all post-undergraduate employment, and highlight all management-level jobs held and any non-managerial jobs that relate to the position for which you are nominated.

Broad Institute of MIT and Harvard
President and Founding Director, 2003–2021
Core Faculty Member 2003-present (on leave)

Massachusetts Institute of Technology, Department of Biology
Professor, 1993–present (on leave)
Associate Professor, 1989–1993
Visiting Scientist, 1984–1989

Harvard Medical School, Department of Systems Biology
Professor, 2004–present (on leave)

Whitehead Institute for Biomedical Research
Director, Whitehead/MIT Center for Genome Research, 1990–2003
Member, 1989–2008
Whitehead Fellow, 1986–1989

Harvard University, Graduate School of Business
Associate Professor, 1987–1990
Assistant Professor, 1981–1986

Cold Spring Harbor Laboratory
Summer Course Lecturer, Summer 1987, 1989, 1990

The Jackson Laboratory
Summer Course Lecturer, Summer 1987, 1989, 1990

Hampshire College Summer Studies in Mathematics
Summer Course Faculty, Summer 1975, 1976, 1979

9. Attach a copy of your resume.

   My CV is attached as Appendix A9 "Resume".

10. List any advisory, consultative, honorary, or other part-time service or positions with Federal, State, or local governments, other than those listed above, within the last ten years.

    Massachusetts' COVID-19 Medical Advisory Board: Member, 2020-2021

    Defense Innovation Board, Office of the Secretary of Defense: Member, 2016-2020

    President's Council on Jobs and Competitiveness (President's Jobs Council), Executive Office of the President: Member, 2011-2012

President's Council of Advisors on Science and Technology (PCAST), Executive Office of the President: Co-Chair, 2009-2017

11. List all positions held as an officer, director, trustee, partner, proprietor, agent, representative, or consultant of any corporation, company, firm, partnership, or other business, enterprise, educational, or other institution within the last ten years.

For Profit Companies:
Codiak BioSciences, Board of Directors
Foundation Medicine, Founding Advisor
FPrime (formerly Fidelity Biosciences), Scientific Advisory Board
Infinity Pharmaceuticals, Board of Directors
Neon Therapeutics, Board of Directors
Third Rock Ventures, Scientific Advisory Board
Verastem, Founding Advisor

Non-Profit Organizations or Committees:
Ariadne Labs, Advisory Board Member
Biden Cancer Initiative, Secretary and Member, Board of Directors
Boston University, Member, Board of Trustees
Count Me In, Member, Board of Directors
Global Alliance for Genomics & Health (GA4GH), Member, Strategic Advisory Board
Harvard Kennedy School, Belfer Center for Science and International Affairs, Member, Board of Directors
Innocence Project, Member, Board of Directors
Institute for Molecular Medicine Finland, Member, Scientific Advisory Board
Life Science Cares, Member, Board of Advisors
Massachusetts General Hospital, Member, Research Advisory Council
Ontario Institute for Cancer Research: Co-Chair Scientific Advisory Board
Parker Institute for Cancer Immunotherapy (PICI), Member, Board of Trustees
Parker Institute for Cancer Immunotherapy, Member, Scientific Advisory Board
Ragon Institute, Member, Scientific Advisory Board
Salk Institute, Helmsley Center for Genomic Medicine, Advisory Board Member
Salk Institute for Biological Studies, Non-Resident Fellow
Society for Science & The Public, Member, Honorary Board

12. Please list each membership you have had during the past ten years or currently hold with any civic, social, charitable, educational, political, professional, fraternal, benevolent or religiously affiliated organization, private club, or other membership organization. (For this question, you do not have to list your religious affiliation or membership in a religious house of worship or institution.). Include dates of membership and any positions you have held with any organization. Please note whether any such club or organization restricts membership on the basis of sex, race, color, religion, national origin, age, or

disability.

I am a member of various scientific societies:
American Association for Cancer Research
New York Academy of Medicine (honorary fellow)
American Society of Human Genetics
American Society for Microbiology
American Academy of Microbiology
American Association for the Advancement of Science
New York Academy of Sciences
Genetics Society of America
International Society for Computational Biology

I am also a member of
Council on Foreign Relations
Examiner's Club (which organizes informal talks in Boston)

None of these organizations restricts membership on the basis of sex, race, color, religion, national origin, age, or disability.

13. Have you ever been a candidate for and/or held a public office (elected, non-elected, or appointed)? If so, indicate whether any campaign has any outstanding debt, the amount, and whether you are personally liable for that debt.

No.

14. List all memberships and offices held with and services rendered to, whether compensated or not, any political party or election committee within the past ten years. If you have held a paid position or served in a formal or official advisory position (whether compensated or not) in a political campaign within the past ten years, identify the particulars of the campaign, including the candidate, year of the campaign, and your title and responsibilities.

Hillary for America, Science Policy Working Group, Senior Partner (2015-2016) [uncompensated]

15. Itemize all political contributions to any individual, campaign organization, political party, political action committee, or similar entity of $500 or more for the past ten years.

9/29/11	Barack Obama	$2,500
9/30/11	Robert Massie	$500
3/31/12	Barack Obama	$2,500
3/31/12	Elizabeth Warren	$2,500

3/31/12	Eiizabeth Warren	$2,500
10/22/12	DNC	$5,000
11/2/12	DNC	$15,000
6/6/13	Democratic State Committee of Massachusetts	$2,400
6/25/13	Ed Markey	$2,600
6/24/14	Katherine Clark	$1,000
7/29/14	Maura Healey	$500
9/15/15	Hillary Clinton	$2,700
9/22/16	Democratic Senatorial Campaign Committee	$2,500
9/27/16	Maggie Hassan	$1,000
5/31/17	Elizabeth Warren	$2,700
5/24/19	Ed Markey	$2,800
6/30/19	Elizabeth Warren	$250
8/27/19	Elizabeth Warren	$2,550
10/25/19	Katherine Clark	$1,000
11/10/19	Jake Auchincloss	$500
12/31/19	Joe Biden	$2,800
12/31/19	Elizabeth Warren	$2,800
12/31/19	Elizabeth Warren	$250
5/8/20	Ed Markey	$2,800
8/11/20	Joe Biden	$2,800

16. List all scholarships, fellowships, honorary degrees, honorary society memberships, military medals, and any other special recognition for outstanding service or achievements.

Honorary Degrees:
Charles University, Czech Republic, Honorary Doctorate, 2020
Ben-Gurion University of the Negev, Israel, Honorary Doctorate, 2017
Université catholique de Louvain, Belgium, Honorary Doctorate, 2017
Brandeis University, Honorary Doctorate, 2014
Worcester Polytechnic Institute, Honorary Doctorate and Commencement Speaker, 2013
Columbia University, Honorary Doctorate, 2008
Lund University, Sweden, Honorary Doctorate, 2007
Northeastern University, Honorary Doctorate and Commencement Speaker,

2005
University of Massachusetts at Lowell, Honorary Doctorate, 2005
Williams College, Honorary Doctorate and Commencement Speaker, 2003
Mount Sinai School of Medicine, Honorary Doctorate, 2001
Medical College of Wisconsin, Honorary Doctorate, 2001
Tel Aviv University, Honorary Doctorate, 2000

Elected or Appointed Academies:
Pontifical Academy of Sciences, 2020
Royal Swedish Academy of Sciences, Class of Biosciences, 2013
European Molecular Biology Organization, 2012
Academy of Athens, 2009
U.S. Institute of Medicine (now U.S. National Academy of Medicine), 1999
American Academy of Arts and Sciences, 1999
American Academy of Achievement, 1999
U.S. National Academy of Sciences, 1997

Award, Prizes and Other Recognition:
Association for Molecular Pathology (AMP) Award for Excellence in Molecular Diagnostics, 2016

Friends of Cancer Research Leadership Award, 2016
"for pioneering research unlocking the molecular origins of cancer, leadership guiding our nation's scientific priorities, and dedication to empowering a new generation of researchers to accelerate biomedical advancements"

James R. Killian, Jr. Faculty Achievement Award, MIT, 2016

"for extraordinary professional achievements by an MIT faculty member"

Fellow, American Association for Cancer Research Academy, 2016

AAAS Philip Hauge Abelson Prize, 2015

"*for signal contributions to the advancement of science in the United States*"

Han-Mo Koo Memorial Award, Van Andel Institute, 2015

Time Magazine's 10 years of Influence, 2013

Block Memorial Award for Distinguished Achievement in Cancer Research, Ohio State University, 2013

Breakthrough Prize in Life Sciences, 2013

"For the discovery of general principles for identifying human disease genes, and enabling their application to medicine through the creation and analysis of genetic, physical and sequence maps of the human genome."

Harvey Prize for Human Health, Technion University, Israel, 2012

"In recognition of his significant contributions to the field of genomics, as the driving force behind most of the major advances in this field."

Dan David Prize, Genome Research, Tel Aviv University, Israel, 2012

"For the Future Dimension - Genome Research"

Dart/NYU Biotechnology Achievement Award, 2012

Albany Prize in Medicine and Biomedical Research, Albany Medical College, 2010

New York Academy of Medicine Medal for Distinguished Contribution in Biomedical Sciences, 2009

A. Clifford Barger Excellence in Mentoring Award, Harvard Medical School, 2008-2009

US News & World Report "America's Best Leaders," 2006

Reenpaa Medal, Finnish Cultural Foundation, 2006

AAAS Award for Public Understanding of Science and Technology, 2004

"for his excellence in communicating complex scientific ideas, and their implications for society, to the general public and policy-makers, while actively engaged in a demanding and aggressive research program."

Research!America Award for Sustained Leadership at the National Level, 2004

Lila Gruber Cancer Award, American Academy of Dermatology, 2004

Time Magazine, List of "100 Most Influential People in the World Today," 2004

Josiah Willard Gibbs Prize Lecturer, American Mathematical Society, 2004

American Scientist of the Year Award, R&D Magazine, 2003

Scientist of the Year Award, National Disease Research Interchange, 2003

Alfred Benzon Foundation Prize, Denmark, 2002

Gairdner Foundation International Award, Canada, 2002

"*for his major seminal contribution to the sequencing of the human and other genomes*"

John von Neumann Award, Society for Industrial and Applied Mathematics, Philadelphia, 2002

Special Achievement Award, Miami Nature Biotechnology Winter Symposium, 2002

City of Medicine Award, 2001, with John Sulston and Robert Waterston

Max Delbruck Medal, Berlin, 2001

J. Allyn Taylor Prize, Canada, 2001

Novartis Drew Award in Biomedical Research, 2001

Distinguished Service Award, American College of Neuropsychopharmacology, 2001

Allen Award, American Society of Human Genetics, 2000

"*to the community of scientists that carried out the Human Genome Project*", accepted on behalf of community, together with Francis Collins and Craig Venter

Beckman Prize, American Association for Lab Automation, 2000

Millennium Lecturer, The White House, October 1999

Pasarow Prize in Cancer, Robert J. and Claire Pasarow Foundation, 1998

Chiron Prize for Biotechnology, American Society for Microbiology, 1998

Phi Beta Kappa Associates Award, 1998

"*for outstanding work as a scientist*"

Woodrow Wilson Award for Public Service, Princeton University, 1998

"*the university's highest award to an alumnus of the undergraduate college*"

American Academy of Microbiology, elected 1997

Dickson Prize in Medicine, University of Pittsburgh, 1997

Class of 1960 Fellows Award, Massachusetts Institute of Technology, 1996

"*for outstanding teaching*"

Kroc Distinguished Lecturer, University of Washington, Seattle, 1996

Rhoads Memorial Award, American Association for Cancer Research, 1995

"*for excellence in cancer research*"

Herman Beerman Lecturer, Society for Investigative Dermatology, 1995

Herbert Boyer Lecturer in Genetics, University of California at San Francisco, 1995

Gladstone Distinguished Lecturer, Gladstone Institute, 1994

Ralph R. Braund Distinguished Visiting Professor, University of Tennessee, 1994

Herbert W. Dickerman Award, New York Department of Health, 1993

Christian A. Herter Distinguished Lecturer, New York University, 1993

Baker Memorial Prize for Excellence in Undergraduate Teaching, MIT, 1992

Fellow, American Association for the Advancement of Science, 1990

"*for research on the application of mathematical and statistical approaches to molecular genetics*"

MacArthur Prize Fellow, *for research in human genetics and mathematics*, 1987–1992

Rhodes Scholar, 1978–1981

Johnson Memorial Bequest, Oxford University, June 1981

for best thesis in mathematics,

Senior Prize, Oxford University, June 1981

Valedictorian, Princeton University, June 1978

Pyne Prize, Princeton University, February 1978

"*the highest award the university confers upon an undergraduate*"

Phi Beta Kappa Award, Princeton University, June 1978

"*for highest academic achievement*"

Class of 1863 Prize and Andrew Brown Prize in Mathematics, Princeton University, 1976, 1977

U.S. Mathematical Olympiad Team, Silver Medal, 16th International Mathematical Olympiad, Erfurt, East Germany, 1974

First Place, Westinghouse Science Talent Search, 1974

17. Please list each book, article, column, Internet blog posting, or other publication you have authored, individually or with others. Include a link to each publication when possible. Also list any speeches that you have given on topics relevant to the position for which you have been nominated. Do not attach copies of these publications unless otherwise instructed.

BOOK

1. Lander, E.S. (1983). *Symmetric designs: an algebraic approach* (Vol. 74). New York, NY: Cambridge University Press.

EDITED BOOK

2. Lander, E.S., & Waterman, M.S. (Eds.). (1995). *Calculating the secrets of life: Contributions of the mathematical sciences to molecular biology*. Washington, DC: National Academy Press.

ARTICLES

Mathematics

3. Lander, E.S. (1981). Symmetric designs and self-dual codes. *Journal of the London Mathematical Society*, *2*(2), 193-204.

4. Lander, E.S. (1981). Characterization of biplanes by their automorphism groups. In M. Aigner & D. Jungnickel. (Eds.), *Geometries and groups* (pp. 204-218). Berlin Heidelberg, Germany: Springer-Verlag.

5. Lander, E.S. (1988). Characterizing symmetric designs by their symmetries. *Journal of Algebra*, *113*(1), 1-18.

6. Lander, E.S. (1988). Restrictions upon multipliers of an abelian difference set. *Archiv der Mathematik*, *50*(3), 241-242.

7. Arratia, R., & Lander, E.S. (1990). The distribution of clusters in random graphs. *Advances in Applied Mathematics*, *11*(1), 36-48.

8. Chernoff, H., & Lander, E.S. (1995). Asymptotic distribution of the likelihood ratio test that a mixture of two binomials is a single binomial. *Journal of Statistical Planning and Inference*, *43*(1), 19-40.

Economics

9. Farrell, J., & Lander, E.S. (1989). Competition between and within teams: The lifeboat principle. *Economics Letters*, *29*(3), 205-208.

Biology

10. Lander, E.S., & Botstein, D. (1986). Consanguinity and heterogeneity: Cystic fibrosis need not be homogeneous in Italy. *American Journal of Human Genetics*, *39*(2), 282-283. PMID: 3752091; PMCID: PMC1683934.

11. Lander, E.S., & Botstein, D. (1986). Strategies for studying heterogeneous genetic traits in humans by using a linkage map of restriction fragment length polymorphisms. *Proceedings of the National Academy of Sciences*, *83*(19), 7353-7357. PMID: 2876423; PMCID: PMC386715.

12. Lander, E.S., & Botstein, D. (1986). Mapping complex genetic traits in humans: new methods using a complete RFLP linkage map. *Cold Spring Harbor Symposia on Quantitative Biology, 51*(Pt 1), 49-62. PMID: 2884068.

13. Lander, E.S., & Green, P. (1987). Construction of multilocus genetic linkage maps in humans. *Proceedings of the National Academy of Sciences USA*, *84*(8), 2363-2367. PMID: 3470801; PMCID: PMC304651.

14. Lander, E.S., & Botstein, D. (1987). Homozygosity mapping: a way to map human recessive traits with the DNA of inbred children. *Science*, *236*(4808), 1567-1570. PMID: 2884728.

15. Green, P., Barker, D., Knowlton, R., Schumm, J., Lander, E.S., Oliphant, A., Willard, H., Akots, G., Brown, V., Gravius, T., Helms, C., Nelson, C., Parker, C., Rediker, K., Watt, D., Weiffenbach, B., & Donis-Keller, H. (1987). A genetic linkage map of chromosome 7 including the cystic fibrosis region. In: G. Mastella & P.M. Quinton (Eds.), *Cellular and Molecular Basis of Cystic Fibrosis*. San Francisco, CA: San Francisco Press.

16. Barker, D., Green, P., Knowlton, R., Schumm, J., Lander, E.S., Oliphant, A., Willard, H., Akots, G., Brown, V., Gravius, T., Helms, C., Nelson, C., Parker, C., Rediker, K., Rising, M., Watt, D., Weiffenbach, B., & Donis-Keller, H. (1987). Genetic linkage map of human chromosome 7 with 63 DNA markers. *Proceedings of the National Academy of Sciences USA*, *84*(22), 8006-8010. PMID: 2891136; PMCID: PMC299465.

17. Lander, E.S., Green, P., Abrahamson, J., Barlow, A., Daly, M.J., Lincoln, S.E., & Newburg, L. (1987). MAPMAKER: an interactive computer package for constructing primary genetic linkage maps of experimental and natural populations. *Genomics*, *1*(2), 174-181. PMID: 3692487.

18. Donis-Keller, H., Green, P., Helms, C., Cartinhour, S., Weiffenbach, B., Stephens, K., Keith, T.P., Bowden, D.W., Smith, D.R., Lander, E.S., Botstein, D., Akots, G., Rediker, K.S., Gravius, T., Brown, V.A., Rising, M.B., Parker, C., Powers, J.A., Watt, D.E., Kauffman, E.R., Bricker, A., Phipps, P., Muller-Kahle, H., Fulton, T.R., Ng, S., Schumm, J.W., Braman, J.C., Knowlton, R.G., Barker, D.F., Crooks, S.M., Lincoln, S., Daly, M.J., & Abrahamson, J. (1987). A genetic linkage map of the human genome. *Cell*, *51*(2), 319-337. PMID: 3664638.

19. Lincoln, S.E., & Lander, E.S. (1987). Constructing genetic linkage maps with MAPMAKER: A tutorial and reference manual. *Whitehead Institute Technical Report*, 107.

20. Lander, E.S. (1987). The new human genetics: Mapping inherited diseases. *Princeton Alumni Weekly*, (March 25), 10-16.

21. Lander, E.S., & Waterman, M.S. (1988). Genomic mapping by fingerprinting random clones: a mathematical analysis. *Genomics*, *2*(3), 231-239. PMID: 3294162.

22. Chang, C., Bowman, J.L., DeJohn, A.W., Lander, E.S., & Meyerowitz, E.M. (1988). Restriction fragment length polymorphism linkage map for Arabidopsis thaliana. *Proceedings of the National Academy of Sciences USA*, *85*(18), 6856-6860. PMID: 2901107; PMCID: PMC282077.

23. Dracopoli, N.C., Stanger, B.Z., Ito, C.Y., Call, K.M., Lincoln, S.E., Lander, E.S., Housman, D.E. (1988). A genetic linkage map of 27 loci from PND to FY on the short arm of human chromosome I. *American Journal of Human Genetics*, *43*(4), 462-470. PMID: 2902785; PMCID: PMC1715484.

24. Lander, E.S., & Lincoln, S.E. (1988). The appropriate threshold for declaring linkage when allowing sex-specific recombination rates. *American Journal of Human Genetics*, *43*(4), 396-400. PMID: 3177382; PMCID: PMC1715500.

25. Paterson, A.H., Lander, E.S., Hewitt, J.D., Peterson, S., Lincoln, S.E., & Tanksley, S.D. (1988). Resolution of quantitative traits into Mendelian factors by using a complete linkage map of restriction fragment length polymorphisms. *Nature*, *335*(6192), 721-726. PMID: 2902517.

26. Lander, E.S. (1988). Splitting schizophrenia. *Nature*, *336*(6195), 105-106. PMID: 2903447.

27. Lander, E.S. (1988). Mapping complex genetic traits in humans. In: K. Davies (Ed.), *Genome analysis: A practical approach* (pp. 171-188). Oxford: IRL Press.

28. Lander, E.S. (1988). Restriction fragments: Their properties and uses. In: M. Waterman (Ed.), *Mathematical methods for DNA sequences* (pp. 35–52). Boca Raton, FL: CRC Press.

29. Hulbert, S.H., Ilott, T.W., Legg, E.J., Lincoln, S.E., Lander, E.S., & Michelmore, R.W. (1988). Genetic analysis of the fungus, Bremia lactucae, using restriction fragment length polymorphisms. *Genetics*, *120*(4), 947-958. PMID: 2906309; PMCID: PMC1203586.

30. Lander, E.S., Mesirov, J.P., & Taylor, W.J. (1988). Protein sequence comparison on a data parallel computer. *Proceedings of the 1988 International Conference on Parallel Processing, August 15-19, 1988 / sponsored by Department of Electrical Engineering, Penn State Universit*

31. Lander, E.S., & Botstein, D. (1989). Mapping mendelian factors underlying quantitative traits using RFLP linkage maps. *Genetics*, *121*(1), 185-199. PMID: 2563713; PMCID: PMC1203601.

32. Pato, C.N., Lander, E.S., & Schulz, S.C. (1989). Prospects for the genetic analysis of schizophrenia. *Schizophrenia Bulletin*, *15*(3), 365-372. PMID: 2683037.

33. Lander, E.S. (1989). DNA fingerprinting on trial. *Nature*, *339*(6225), 501-505. PMID: 2567496.

34. Lander, E.S. (1989). Population genetic considerations in the forensic use of DNA typing. *Banbury Report*, *32*, 143-156.

35. Lander, E.S., & Daly, M.J. (1989). Genetic mapping of the cystic fibrosis region: Multipoint linkage analysis in two-generation pedigrees. In: R.C. Elston, M.A. Spence, S.E. Hodge, & J.W. MacCluer (Eds.), *Genetic Analysis Workshop 6: Multipoint Mapping and Linkage Based upon Affected Pedigree Members.* New York: Alan R. Liss.

36. Lander, E.S., Mesirov, J.P., & Taylor, W.J. (1989). Study of protein sequence comparison metrics on the Connection Machine CM-2. *The Journal of Supercomputing*, *3*(4), 255-269.

37. Lander, E.S. (1989). Genetic mapping of polygenic factors causing diabetes in inbred rodent strains. In: *Nordisk Insulin Symposium No. 3: Genes and Gene Products in the Development of Diabetes Mellitus – Basic and Clinical Aspects*, *Oslo, Norway*. Amsterdam: Elsevier Publishers.

38. Accili, D., Frapier, C., Mosthaf, L., McKeon, C., Elbein, S.C., Permutt, M.A., Ramon, E., Lander, E.S., Ullrich, A., & Taylor, S.I. (1989). A mutation in the insulin receptor gene that impairs transport of the receptor to the plasma membrane and causes insulin-resistant diabetes. *The EMBO Journal*, *8*(9), 2509-2517. PMID: 2573522; PMCID: PMC401244.

39. Lander E.S., & Botstein, D. (1989). Accurate and efficient mapping of quantitative trait loci. In: T. Helentjaris & B. Burr (Eds.), *Development and Application of Molecular Markers in Problems in Plant Genetics; Current Communications in Molecular Biology* (pp. 89-96). Cold Spring Harbor, NY: Cold Spring Harbor Press.

40. Jones, R., Taylor, W.J., Zhang, X., Mesirov, J.P., & Lander, E.S. (1990). Protein sequence comparison on the Connection Machine CM-2. In *Computers and DNA: Proceedings of the Interface Between Computation Science and Nucleic Acid Sequencing Workshop, Dec 12-16, 1988*. Redwood City, Calif.: Addison-Wesley Pub. Co.

41. Lander, E.S., & Lodish, H. (1990). Mitochondrial diseases: gene mapping and gene therapy. *Cell*, *61*(6), 925-926. PMID: 2190693.

42. Chakravarti, A., & Lander, E.S. (1990). Genetic approaches to the dissection of complex diseases. *Banbury Report*, *33*, 307-315.

43. Immerman, N., & Lander, E.S. (1990). Describing graphs: A first-order approach to graph canonization. In A.L. Selman (Ed.), *Complexity Theory Retrospective* (pp. 59-81). New York, NY: Springer-Verlag.

44. Paterson A.H., Lander, E.S., & Tanksley, S.D. (1990). Mapping QTLs affecting agriculturally important traits: Some examples from the tomato. In: J.E. Womack (Ed.), *Mapping the Genomes of Agriculturally Important Animals*. Cold Spring Harbor, NY: Cold Spring Harbor Press.

45. MacMurray, A.J., Weaver, A., Shin, H.S., & Lander, E.S. (1991). An automated method for DNA preparation from thousands of YAC clones. *Nucleic Acids Research*, *19*(2), 385-390. PMID: 2014175; PMCID: PMC333606.

46. Paterson, A.H., Damon, S., Hewitt, J.D., Zamir, D., Rabinowitch, H.D., Lincoln, S.E., Lander, E.S., & Tanksley, S.D. (1991). Mendelian factors underlying quantitative traits in tomato: comparison across species, generations, and environments. *Genetics*, *127*(1), 181-197. PMID: 1673106; PMCID: PMC1204303.

47. Lander, E.S., & Green, P. (1991). Counting algorithms for linkage: correction to Morton and Collins. *Annals of Human Genetics*, *55*(Pt. 1), 33-38. PMID: 2042933.

48. Lander, E.S. (1991). Molecular Biology: The new frontier for computational science. *Very Large Scale Computation in the 21st Century*, *25*, 138.

49. Green, P., & Lander, E.S. (1991). Forensic DNA tests and Hardy-Weinberg equilibrium. *Science*, *253*(5023), 1038-1039. PMID: 17775346.

50. Lander, E.S. (1991). Research on DNA typing catching up with courtroom application. *American Journal of Human Genetics*, *48*(5), 819-823. PMID: 1760000; PMCID: PMC1683053.

51. Lander, E.S. (1991). Research on DNA typing validated in the literature [Reply]. *American Journal of Human Genetics 49*, 899-903.

52. Jacob, H.J., Lindpaintner, K., Lincoln, S.E., Kusumi, K., Bunker, R.K., Mao, Y.P., Ganten, D., Dzau, V.J., & Lander, E.S. (1991). Genetic mapping of a gene causing hypertension in the stroke-prone spontaneously hypertensive rat. *Cell*, *67*(1), 213-224. PMID: 1655275.

53. Arratia, R., Lander, E.S., Tavaré, S., & Waterman, M.S. (1991). Genomic mapping by anchoring random clones: A mathematical analysis. *Genomics*, *11*(4), 806-827. PMID: 1783390.

54. Lander, E.S., Langridge, R., & Saccocio, D.M. (1991). Computing in molecular biology: mapping and interpreting biological information. *Computer*, *24*(11), 6-13.

55. Dietrich, W., Katz, H., Lincoln, S.E., Shin, H.S., Friedman, J., Dracopoli, N.C., & Lander, E.S. (1992). A genetic map of the mouse suitable for typing intraspecific crosses. *Genetics*, *131*(2), 423-447. PMID: 1353738; PMCID: PMC1205016.

56. Stuber, C.W., Lincoln, S.E., Wolff, D.W., Helentjaris, T., & Lander, E.S. (1992). Identification of genetic factors contributing to heterosis in a hybrid from two elite maize inbred lines using molecular markers. *Genetics*, *132*(3), 823-839. PMID: 1468633; PMCID: PMC1205218.

57. Jacob, H.J., Pettersson, A., Wilson, D., Mao, Y., Lernmark, A., & Lander, E.S. (1992). Genetic dissection of autoimmune type I diabetes in the BB rat. *Nature Genetics*, *2*(1), 56-60. PMID: 1303251.

58. Lander, E.S. (1992). DNA fingerprinting: Science, law, and the ultimate identifier. In: D.J. Kevles & L. Hood (Eds.), *The Code of Codes: Scientific and Social Issues in the Human Genome Project* (pp. 191-210). Cambridge, MA: Harvard University Press.

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586. Collins F.S., Doudna J.A., Lander E.S., Rotimi C.N. Human Molecular Genetics and Genomics - Important Advances and Exciting Possibilities. (2021). *New England Journal of Medicine*. Epub ahead of print.

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IV. OTHER PUBLICATIONS

I have also authored OpEds, PCAST reports during the Obama Administration, Ad Hoc working group reports, Supreme Court amicus briefs, and a law review article.

OpEds:

- Just when we need it most, science is in danger (Boston Globe): https://www.bostonglobe.com/2020/10/08/opinion/just-when-we-need-it-most-science-is-danger/
- Looking to the future of patient-centered cancer research and treatment (Boston Globe; with Reed Jobs): https://www.bostonglobe.com/opinion/2018/10/18/looking-future-patient-centered-cancer-research-and-treatment/C7jJ2lV0Z0PjOHZOxv9oyJ/story.html
- Will America yield its position as the world's leader in science and technology? (Boston Globe): https://www.broadinstitute.org/files/sections/about/012918-BostonGlobe-LanderOpEd.pdf
- America's 'Miracle Machine' is in desperate need of, well, a miracle (Washington Post; with Eric Schmidt): https://www.broadinstitute.org/files/sections/about/050517-WashPost-OpEdMiracleMachine.pdf
- Hype vs. hope in medical research (Boston Globe/Medium): https://www.broadinstitute.org/files/sections/about/BostonGlobe-HypeVsHope-opinion.pdf (Medium:

https://medium.com/@eric_lander/hype-vs-hope-in-medical-research-3fbd8edf018d)

- Fix the Flaws in Forensic Science (New York Times): https://www.nytimes.com/2015/04/21/opinion/fix-the-flaws-in-forensic-science.html
- Private Money Pays Off For Medicine (Wall Street Journal; with Louis V. Gerstner, Jr.): https://www.wsj.com/articles/eric-lander-and-louis-gerstner-private-money-pays-off-for-medicine-1407710070
- The Accelerator (Science): https://science.sciencemag.org/content/331/6020/1024.2.full
- In Wake of Genetic Revolution, Questions About Its Meaning (New York Times): https://www.nytimes.com/2000/09/12/science/essay-in-wake-of-genetic-revolution-questions-about-its-meaning.html

Law Review Article:

- Fixing Rule 702: The PCAST Report and Steps to Ensure the Reliability of Forensic Feature-Comparison Methods in the Criminal Courts: https://www.broadinstitute.org/files/sections/about/PCAST/2018%20ensuring-reliability-forensic.pdf

Supreme Court Amicus Briefs:

- *Association of Molecular Pathology v. Myriad Genetics*: https://www.broadinstitute.org/files/sections/about/12-398-ac-Lander.pdf
- *Gill v. Whitford*: https://www.brennancenter.org/sites/default/files/legal-work/Gill_AmicusBrief_EricLander_InSupportofAppellees.pdf
- *Rucho v. Common Cause*: https://www.broadinstitute.org/files/sections/about/Gerrymandering_AmicusBrief_EricLander_Rucho.pdf

Reports

- **International Commission on the Clinical Use of Human Germline Genome Editing** Heritable Human Genome Editing report: https://www.nap.edu/catalog/25665/heritable-human-genome-editing
- **39 Reports of the President's Council of Advisors on Science and Technology (PCAST)**, which I co-chaired during the Obama Administration, 2009-2017 (one classified): https://obamawhitehouse.archives.gov/administration/eop/ostp/pcast/docsreports
- **OPCAST Ad Hoc Pandemic Response Group** (single document with all six reports): https://opcast.org/OPCAST_Compendium.pdf

- **On Human Gene Editing: International Summit Statement:** https://www.nationalacademies.org/news/2015/12/on-human-gene-editing-international-summit-statement
- **National Academy of Sciences Committee on DNA Technology in Forensic Science report:** https://www.nap.edu/catalog/1866/dna-technology-in-forensic-science

V. ONLINE MATERIALS

Online Courses:
Introduction to Biology - The Secret of Life (edX):
https://www.edx.org/course/introduction-to-biology-the-secret-of-life-3
Fundamentals of Biology (MIT OpenCourseware):
https://ocw.mit.edu/courses/biology/7-01sc-fundamentals-of-biology-fall-2011/

Podcasts:
Brave New Planet (host): https://www.pushkin.fm/show/brave-new-planet/
Clear + Vivid (guest)
https://podcasts.apple.com/us/podcast/eric-lander-decoding-life/id1400082430?i=1000506582017
Lovett or Leave It (guest):
https://podcasts.apple.com/us/podcast/coup-clutz-clan/id1216346463?i=1000499693551
Deep Background with Noah Feldman (guest):
https://podcasts.apple.com/us/podcast/the-big-data-revolution/id1460055316?i=1000501053706
Armchair Expert (guest):
https://armchairexpert.simplecast.com/episodes/eric-lander-yfQOlTJc
Stay Tuned with Preet (guest):
https://cafe.com/stay-tuned/playing-god-with-eric-lander/
Theory and Practice (guest):
https://podcasts.apple.com/us/podcast/eric-lander-broad-institute/id1480260459?i=1000459308356
Talking Machines podcast (guest):
https://www.thetalkingmachines.com/episodes/eric-lander-and-restricted-boltzmann-machines

Relevant Lectures and Talks:
Lecture 14: "Rapid research response in a pandemic" (MIT):
https://www.youtube.com/watch?v=HLkuchTScn8
Klinsky Lecture on Science, Law and Policy (Harvard Law School):
https://www.youtube.com/watch?v=2WOZJ-kn2Tc
Science, Technology, and the Future of America (HUBweek):
https://www.youtube.com/watch?v=SfN7b79SSec
"Secrets of the Human Genome" (Killian Lecture):

https://www.youtube.com/watch?t=8m21s&v=ztMBrL21bP4&feature=youtu.be
Precision Medicine: the Promise, the Journey, the Future (Public Health Grand Rounds at the Aspen Institute): https://www.youtube.com/watch?v=Rfh-0xlVCpo
Limits to our Understanding (International Summit on Human Gene Editing): https://vimeo.com/showcase/3703972/video/149192705
The Miracle Machine (National Math Festival): https://vimeo.com/133400574
Aspen Ideas Festival Afternoon of Conversation: https://www.youtube.com/watch?v=ZoTuRTYuY14
Future of U.S. Innovation (Brookings Institute): https://www.c-span.org/video/?300258-4/future-us-innovation#
Save the Miracle Machine: https://www.youtube.com/watch?v=BNqa8TWM_10
Millennium evenings at the White House, Information Meets Genomics: https://www.youtube.com/watch?v=5hnMi714CX0

18. List digital platforms (including social media and other digital content sites) on which you currently or have formerly operated an account, regardless of whether or not the account was held in your name or an alias. Include the name of an "alias" or "handle" you have used on each of the named platforms. Indicate whether the account is active, deleted, or dormant. Include a link to each account if possible.

Twitter [Active]: https://twitter.com/eric_lander (A podcast that I hosted also has a Twitter account, https://twitter.com/BravePlanetPod, although I do not maintain that account.)

Instagram [Dormant]: https://www.instagram.com/ericlander17/

Facebook [Deleted]: I do not have a personal Facebook account. (An account was created in 2013, never used, and then deleted.)

Reddit [Dormant]: https://www.reddit.com/user/Eric_Lander

Medium [Dormant]: https://medium.com/@eric_lander

19. Please identify each instance in which you have testified orally or in writing before Congress in a governmental or non-governmental capacity and specify the date and subject matter of each testimony.

I have testified before such bodies on these two occasions:

1. United States Senate Committee on Commerce, Science, and Space: The Science and Standards of Forensics (March 28, 2012)
2. The House Appropriations Subcommittee on Labor, Health and Human Services, Education, and Related Agencies: FY1996 budget for the National Institutes of Health (February 2, 1995)

To the best of my recollection, I have not testified on other occasions.

20. Given the current mission, major programs, and major operational objectives of the department/agency to which you have been nominated, what in your background or employment experience do you believe affirmatively qualifies you for appointment to the position for which you have been nominated, and why do you wish to serve in that position?

Affirmative qualifications for the Director of the Office of Science and Technology Policy (OSTP): I have worked as scientist for 35 years, including on major scientific projects such as the Human Genome Project; I have served on several bodies that provide advice concerning science and technology to the Federal government, including co-chairing for eight years the President's Council of Advisors on Science and Technology (which provides advice to the President and the White House) and serving for four years on the Defense Innovation Board (which provides advice to the Secretary of Defense and the DOD).

I wish to serve in this position because I believe that (i) US science and technology will be crucial to our Nation's health, economic prosperity and national security in the decades ahead and (ii) sound Federal policies can promote US science and technology.

21. What do you believe are your responsibilities, if confirmed, to ensure that the department/agency has proper management and accounting controls, and what experience do you have in managing a large organization?

Responsibilities to Ensure Proper Management and Accounting Controls:
I recognize that as Director, I would be responsible for all issues of compliance at the agency including management and accounting responsibility. Working with appointed leadership, career staff and Congressional oversight, I will work to ensure that OSTP meets the highest standards of professionalism and compliance to serve the public good. This would include ensuring that the agency adhere to the OSTP Open Government Plan, promoting transparency, timely responses to Congressional and GAO inquiries and compliance with reporting requirements.

Experience Managing Large Organizations:
Since 2004, I have served as the CEO, President and Founding Director of the Broad Institute of MIT and Harvard. Since 2009, the Broad Institute has been an 501(c)(3) non-profit organization, with a large scientific community (currently more than 4,500 people), many employees (currently more than 2,000 people) and a large budget (currently more than $500 million/year).

22. What do you believe to be the top three challenges facing the department/agency, and why?

As the President has noted: In the aftermath of WWII, the United States adopted a wise science and technology strategy that has guided the Nation for 75 years, ensuring that the U.S. has been the world leader in scientific discovery and technological innovation and yielding enormous benefits for the Nation's health, economic prosperity and national security. However, much has changed over the past 75 years — making it now essential to "refresh and reinvigorate our national science and technology strategy to set us on a strong course for the *next* 75 years, so that our children and grandchildren may inhabit a healthier, safer, more just, peaceful, and prosperous world."

The President posed five critical questions, and he is seeking answers in the form of policies — including strategies, activities and structures — to ensure our Nation's success in the decades ahead.

Consistent with the President's letter, I believe the top three challenges are to develop policies to:

(1) Ensure that we learn from the current pandemic in the broadest sense — about what *is* possible or what *should become* possible — to address the widest range of needs related to our public health.

This work includes how we can: dramatically improve our ability to rapidly address threats from pathogens, including emerging pandemics, potential bioweapons, and antibiotic resistance; dramatically speed our ability to develop and conduct clinical trials of therapies for other types of diseases like cancer; enable the rapid sharing, with patient consent, of health information to build a smarter and more effective healthcare system; best use telemedicine to improve health for all Americans; and much more.

(2) Ensure that the United States will be the world leader in the technologies and industries of the future that will be critical to our economic prosperity and national security, especially in competition with China.

New technologies are emerging with increasing rapidity that have the potential to transform our lives, increase our economic prosperity by creating new industries and jobs, and protect our national security. Examples of new or rapidly evolving technologies include artificial intelligence, synthetic biology, quantum computing, advanced energy technologies, advanced manufacturing, cybersecurity, semiconductors, telecommunications, and much more.

Over the past 75 years, America has consistently been a world leader in the development of all major technologies, with huge economic and national security benefits. Today, other countries—especially China—are making unprecedented investments and doing everything in their power to promote the growth of new industries and eclipse America's scientific and technological leadership. Our future depends on our ability to keep pace with our competitors and to lead in the fields that will define the economy of tomorrow.

We need to focus on: maintaining the right level of national investment; creating the structures, infrastructures, and policies needed to accelerate the path from research laboratories to development projects to the marketplace; strengthening and expanding the connections between academia, industry, and government, which have historically been crucial for advancing technology and protecting national security; and ensuring that technological advances create rather than diminish high-quality jobs.

In addition, we need to ensure the long-term health of science and technology in our Nation — from expanding the availability of high-quality STEM education for all students and addressing stresses on colleges and universities, to protecting scientific integrity within government and making government a premier destination for scientists and technologists to work.

(3) Ensure that the creation and rewards of science and technology are fully shared across America and among all Americans.

Science and technology — including training, engagement, employment and the benefits — remain unevenly distributed across racial, gender, economic, and geographic lines in the US. We must ensure that Americans of all backgrounds are drawn into both the creation and the rewards of science and technology. We need to ensure that science and technology hubs flourish in every part of the country. And, we need to ensure that advances in medical science benefit the health of all Americans, including substantially reducing disparities across racial, socioeconomic and geographic disparities in health.

B. POTENTIAL CONFLICTS OF INTEREST

1. Describe all financial arrangements, deferred compensation agreements, and other continuing dealings with business associates, clients, or customers. Please include information related to retirement accounts.

   I have no continuing financial arrangements, deferred compensation agreements, or other continuing dealings with business associates, clients, or customers. My retirement accounts consist of the following:

   a. The Broad Institute, Inc. 457(b) Plan (Fidelity Freedom 2025 K Shares)
   b. Broad Institute, Inc. 401k Retirement Plan (Fidelity Freedom 2025 Fund Class K Shares)
   c. Harvard University Tax-Deferred Annuity Plan (Vanguard Institutional Target Retirement 2020 Fund Institutional Class Shares)
   d. A Sep IRA, consisting of:
      a) Old Westbury Fixed Income Fund
      b) Old Westbury Credit Income Fund
      c) Old Westbury Large Cap Strategies
      d) Old Westbury Small & Mid Cap Strategies
      e) Old Westbury All Cap Core Fund
      f) Old Westbury Multi-Asset Opportunities Fund
   e. A Traditional IRA, consisting of:
      a) Old Westbury Fixed Income Fund
      b) Old Westbury Multi-Asset Opportunities Fund
      c) Old Westbury Credit Income Fund
      d) Old Westbury Large Cap Strategies
      e) Old Westbury Small & Mid Cap Strategies
      f) Old Westbury All Cap Core Fund
   f. Whitehead Institute for Biomedical Research, consisting of:
      a) TIAA Traditional
      b) CREF Stock
      c) CREF Growth
      d) CREF Equity Index
   g. Whitehead Institute for Biomedical Research 403(B), consisting of:
      a) CREF Growth
      b) CREF Bond Market
   h. Retirement Income Plan For Teaching Faculty of Harvard University, consisting of:
      a) TIAA Traditional
      b) CREF Stock R3

For the Broad Institute 457(b) and 401k plans, I will continue to participate in this defined contribution plan. The plan sponsor will not make contributions while I am on an unpaid leave of absence during my government service.

For the Harvard University Tax-Deferred Annuity Plan, I will continue to participate in this defined contribution plan. The plan sponsor will not make contributions while I am on an unpaid leave of absence during my government service.

For the Whitehead Institute for Biomedical Research retirement accounts, I will continue to participate in this defined contribution plan. The plan sponsor ceased making contributions
upon my separation.

For the Retirement Income Plan for Teaching Faculty of Harvard University, I will continue to participate in this defined contribution plan. The plan sponsor will not make contributions while I am on an unpaid leave of absence during my government service.

2. Do you have any commitments or agreements, formal or informal, to maintain employment, affiliation, or practice with any business, association or other organization during your appointment? If so, please explain.

   As described in my ethics agreement, I have been granted leaves of absence from my tenured faculty appointments at (i) MIT, (ii) Harvard and (iii) the Broad Institute of MIT and Harvard, pursuant to their leave of absence policies and will abide by the terms governing those leaves set forth in the ethics agreement.

3. Indicate any investments, obligations, liabilities, or other relationships which could involve potential conflicts of interest in the position to which you have been nominated. Explain how you will resolve each potential conflict of interest.

   In connection with the nomination process, I have consulted with the Office of Government Ethics and the Designated Agency Ethics Official at the Office of Science Technology Policy to identify any potential conflict of interest. Any conflict of interest will be resolved according to the terms of an ethics agreement that I have entered into with OSTP's Designated Agency Ethics Official and that will be provided to this Committee. In the event that an actual or potential conflict of interest arises during my appointment, I will consult with OSTP's ethics counsel and take the measures necessary to resolve the conflict.

4. Describe any business relationship, dealing, or financial transaction which you have had during the last ten years, whether for yourself, on behalf of a client, or acting as an agent, that could in any way constitute or result in a possible conflict of interest in the position to which you have been nominated. Explain how you will resolve each potential conflict of interest.

In connection with the nomination process, I have consulted with the Office of Government Ethics and the Designated Agency Ethics Official at the Office of Science Technology Policy to identify any potential conflict of interest. Any conflict of interest will be resolved according to the terms of an ethics agreement that I have entered into with OSTP's Designated Agency Ethics Official and that will be provided to this Committee. In the event that an actual or potential conflict of interest arises during my appointment, I will consult with OSTP's ethics counsel and take the measures necessary to resolve the conflict.

5. Identify any other potential conflicts of interest, and explain how you will resolve each potential conflict of interest.

   In connection with the nomination process, I have consulted with the Office of Government Ethics and the Designated Agency Ethics Official at the Office of Science Technology Policy to identify any potential conflict of interest. Any conflict of interest will be resolved according to the terms of an ethics agreement that I have entered into with OSTP's Designated Agency Ethics Official and that will be provided to this Committee. In the event that an actual or potential conflict of interest arises during my appointment, I will consult with OSTP's ethics counsel and take the measures necessary to resolve the conflict.

6. Describe any activity during the past ten years, including the names of clients represented, in which you have been engaged for the purpose of directly or indirectly influencing the passage, defeat, or modification of any legislation or affecting the administration and execution of law or public policy.

   None.

C. LEGAL MATTERS

1. Have you ever been disciplined or cited for a breach of ethics, professional misconduct, or retaliation by, or been the subject of a complaint to, any court, administrative agency, the Office of Special Counsel, professional association, disciplinary committee, or other professional group? If yes:
    a. Provide the name of agency, association, committee, or group;
    b. Provide the date the citation, disciplinary action, complaint, or personnel action was issued or initiated;
    c. Describe the citation, disciplinary action, complaint, or personnel action;
    d. Provide the results of the citation, disciplinary action, complaint, or personnel action.

    No.

2. Have you ever been investigated, arrested, charged, or held by any Federal, State, or other law enforcement authority of any Federal, State, county, or municipal entity, other than for a minor traffic offense? If so, please explain.

    No, (except for routine background investigations required for security clearance).

3. Have you or any business or nonprofit of which you are or were an officer ever been involved as a party in an administrative agency proceeding, criminal proceeding, or civil litigation? If so, please explain.

    CRISPR Patent Litigation. The Broad Institute has been involved in various proceedings related to which party was the first to invent various aspects of the CRISPR genome-editing technology. These patent questions have been the subject of proceedings before the U.S. Patent and Trademark Office and the European Patent Office Board of Appeals, with one decision appealed to the US Court of Appeals, Federal Circuit. The principal cases are listed below.

    - Regents of University of California v. The Broad Institute, Inc. (0:2017bcaag01907), US Court of Appeals, Federal Circuit

        In 2012, researchers from the University of California, University of Vienna, and Emmanuelle Charpentier (collectively, "UC") published their use of CRISPR-Cas9 to precisely cut purified DNA in a test tube. Shortly thereafter, researchers from the Broad Institute, Inc., Massachusetts Institute of Technology, and the President and Fellows of Harvard College (collectively, "Broad") published their use of CRISPR-Cas9 to edit DNA in living cells, including human cells. The Patent Trial and Appeal Board ("Board") found that Broad's invention was patentably *distinct* from UC's. UC appealed, and the Federal Court of Appeals affirmed the Board's decision.

- Boards of Appeal of the European Patent Office, Case Number: T 0844/18-3.308, Application Number: 13818570.7, Publication Number: 2771468

  This appeal concerns European patent 2 771 468 having the title "ENGINEERING OF SYSTEMS, METHODS AND OPTIMIZED GUIDE COMPOSITIONS FOR SEQUENCE MANIPULATION" that is based upon European patent application No. 13 818 570.7 and the PCT application, PCT/US2013/074819 filed on 12 December 2013 ("PCT '819"). European patent 2 771 468 and PCT '819 claim priority from twelve US provisional patent applications (referred to as P1 to P12 in the decision of the opposition division).

- George W. Schlich v. The Broad Institute, Inc., Feng Zhang, Naomi Habib, and Le Cong (1:2016mc91278), US Court of Appeals, First Circuit

  European patent attorney representing genome editing company petitioned to obtain discovery from non-profit medical research organization in relation to opposition proceedings currently before the European Patent Office (EPO) in which the attorney challenged the validity of several of the organization's European patents involving technology used in the programmable genome editing of mammalian cells. The United States District Court for the District of Massachusetts, F. Dennis Saylor, IV, J., 2016 WL 7209565, denied petition and subsequently, 2017 WL 1015005, denied patent attorney's motion for reconsideration. Patent attorney appealed.

- Benson Hill Biosystems Inc v. The Broad Institute Inc, U.S. Patent and Trademark Office, Case PGR 2018-00072, US Patent No. 9,790,490

  Benson Hill Biosystems requested post grant review of US Patent No 9,790,490, which was assigned to the Broad Institute, Presidents and Fellows of Harvard College, and MIT “patent owners”. This request was denied on 1/22/2019.

Other Litigation

- Xiulin Liu v. The Broad Institute, Inc.(1:2017cv12045), Massachusetts District Court, filed 10/19/17, closed 11/13/17

  In the Complaint, Plaintiff made allegations of wrongful termination and age discrimination. The Broad disputed Plaintiff's claims. The Court dismissed Plaintiff's Complaint on November 13, 2017. Liu made similar allegations in a complaint filed with the Massachusetts Commission Against Discrimination and the U.S. Equal Employment Opportunity Commission; the action was dismissed after investigation by the MCAD.

- Natissa Enterprises Ltd v. Broad Institute (1:2019mc91124), filed 04/02/19, closed 05/02/19, Massachusetts District Court

  Plaintiff filed a Motion to Compel and Enforce Subpoena as to the Broad in regard to a separate matter, In re Illumina Inc. Securities Litigation, No. CV-03044-L (S.D. Cal.). The Broad opposed Plaintiff's motion to compel. Plaintiff agreed, by Stipulation dated and filed on April 30, 2019, to withdraw its motion to compel and dismiss the action against the Broad.

4. Have you ever been convicted (including pleas of guilty or *nolo contendere*) of any criminal violation other than a minor traffic offense? If so, please explain.

   No.

5. Have you ever been accused, formally or informally, of sexual harassment or discrimination on the basis of sex, race, religion, or any other basis? If so, please explain.

   No.

6. Please advise the Committee of any additional information, favorable or unfavorable, which you feel should be disclosed in connection with your nomination.

   I am not aware of additional information relevant to this section.

D. RELATIONSHIP WITH COMMITTEE

1. Will you ensure that your department/agency complies with deadlines for information set by congressional committees, and that your department/agency endeavors to timely comply with requests for information from individual Members of Congress, including requests from members in the minority?

   Yes.

2. Will you ensure that your department/agency does whatever it can to protect congressional witnesses and whistle blowers from reprisal for their testimony and disclosures?

   Yes.

3. Will you cooperate in providing the Committee with requested witnesses, including technical experts and career employees, with firsthand knowledge of matters of interest to the Committee?

   Yes.

4. Are you willing to appear and testify before any duly constituted committee of the Congress on such occasions as you may be reasonably requested to do so?

   Yes.

(Nominee is to include this signed affidavit along with answers to the above questions.)

F. AFFIDAVIT

Eric S. Lander being duly sworn, hereby states that he/she has read and signed the foregoing Statement on Biographical and Financial Information and that the information provided therein is, to the best of his/her knowledge, current, accurate, and complete.

Signature of Nominee

Subscribed and sworn before me this 26th day of Feb, 2021.

Notary Public

Eric Steven Lander
Senate Questionnaire
Attachments A9, E1 and E2

Attachment A9: Resume

Eric Steven Lander

TITLE

President & Founding Director, The Eli and Edythe L. Broad Institute of MIT and Harvard
Professor, Department of Biology, Massachusetts Institute of Technology
Professor, Department of Systems Biology, Harvard Medical School

OFFICE

Broad Institute
415 Main Street, Cambridge, MA 02142
617-714-7010 (phone)

HOME

[redacted]

DATE OF BIRTH

February 3, 1957
Brooklyn, New York

CITIZENSHIP

United States

EDUCATION

Princeton University, Princeton, New Jersey, 1974–1978
A.B. with highest honors in Mathematics, June 1978
Oxford University, Oxford, England, 1978–1981
D. Phil. in Mathematics, January 1981

FACULTY APPOINTMENTS (CURRENT)

The Eli and Edythe L. Broad Institute of MIT and Harvard
President and Founding Director, 2003–present

Massachusetts Institute of Technology, Department of Biology
Professor, 1993–present
Associate Professor (with tenure), 1989–1993
Visiting Scientist, 1984–1989

Harvard Medical School, Department of Systems Biology
Professor, 2004–present

FACULTY APPOINTMENTS (PAST)

Whitehead Institute for Biomedical Research
Director, Whitehead/MIT Center for Genome Research, 1990–2003
Member, 1989–2008
Whitehead Fellow, 1986–1989

Harvard University, Graduate School of Business
Associate Professor, 1987–1990
Assistant Professor, 1981–1986

- Taught courses on mathematics, statistics and economics; developed new courses on bidding and bargaining; artificial intelligence; and science-based businesses.
- During this period learned molecular biology and genetics in laboratories of Peter Cherbas and William Gelbart at Harvard, and H. Robert Horvitz, David Botstein and David Page at MIT.

SUMMER COURSES

The Jackson Laboratory, Bar Harbor, Maine
Short Course in Medical and Mammalian Genetics,
Lecturer, Summer 1987, 1989, 1990

Cold Spring Harbor Laboratory, Cold Spring Harbor, New York
Genetic Approaches to Human Disease Using DNA Markers
Course Co-organizer, Summer 1989, 1990, 1991

Hampshire College Summer Studies in Mathematics, Amherst, Massachusetts
National Science Foundation program for exceptional high school students,
Faculty, Summer 1975, 1976, 1979

MENTORING

Mentored more than 100 scientists, many who have gone on to become faculty at leading universities, research centers, and hospitals (including Harvard, Caltech, Princeton, Massachusetts General Hospital, Brigham and Women's Hospital, Dana-Farber Cancer Institute, Boston Children's Hospital, Fred Hutchinson Cancer Institute, Baylor College of Medicine, Weizmann Institute, Hebrew University of Jerusalem, US National Institutes of Health) and biotechnology and pharmaceutical companies.

HONORARY DOCTORATES

Charles University, Czech Republic, Honorary Doctorate, 2020

Ben-Gurion University of the Negev, Israel, Honorary Doctorate, 2017

Université catholique de Louvain, Belgium, Honorary Doctorate, 2017

Brandeis University, Honorary Doctorate, 2014

Worcester Polytechnic Institute, Honorary Doctorate and Commencement Speaker, 2013

Columbia University, Honorary Doctorate, 2008

Lund University, Sweden, Honorary Doctorate, 2007

Northeastern University, Honorary Doctorate and Commencement Speaker, 2005

University of Massachusetts at Lowell, Honorary Doctorate, 2005

Williams College, Honorary Doctorate and Commencement Speaker, 2003

Mount Sinai School of Medicine, Honorary Doctorate, 2001

Medical College of Wisconsin, Honorary Doctorate, 2001

Tel Aviv University, Honorary Doctorate, 2000

ELECTED ACADEMIES

Pontifical Academy of Sciences, 2020

Council on Foreign Relations, 2014

Royal Swedish Academy of Sciences, Class of Biosciences, 2013

European Molecular Biology Organization, 2012

Academy of Athens, 2009

U.S. Institute of Medicine, 1999

American Academy of Arts and Sciences, 1999

American Academy of Achievement, 1999

U.S. National Academy of Sciences, 1997

AWARDS AND PRIZES (SELECTED)

Association for Molecular Pathology (AMP) Award for Excellence in Molecular Diagnostics, 2016

Friends of Cancer Research Leadership Award, 2016

"for pioneering research unlocking the molecular origins of cancer, leadership guiding our nation's scientific priorities, and dedication to empowering a new generation of researchers to accelerate biomedical advancements"

James R. Killian, Jr. Faculty Achievement Award, MIT, 2016

"for extraordinary professional achievements by an MIT faculty member"

Fellow, American Association for Cancer Research Academy, 2016

AAAS Philip Hauge Abelson Prize, 2015

"*for signal contributions to the advancement of science in the United States*"

Han-Mo Koo Memorial Award, Van Andel Institute, 2015

Time Magazine's 10 years of Influence, 2013

Block Memorial Award for Distinguished Achievement in Cancer Research, Ohio State University, 2013

Breakthrough Prize in Life Sciences, 2013

"For the discovery of general principles for identifying human disease genes, and enabling their application to medicine through the creation and analysis of genetic, physical and sequence maps of the human genome."

Harvey Prize for Human Health, Technion University, Israel, 2012

"In recognition of his significant contributions to the field of genomics, as the driving force behind most of the major advances in this field."

Dan David Prize, Genome Research, Tel Aviv University, Israel, 2012

"For the Future Dimension - Genome Research"

Dart/NYU Biotechnology Achievement Award, 2012

Albany Prize in Medicine and Biomedical Research, Albany Medical College, 2010

New York Academy of Medicine Medal for Distinguished Contribution in Biomedical Sciences, 2009

A. Clifford Barger Excellence in Mentoring Award, Harvard Medical School, 2008-2009

US News & World Report "America's Best Leaders," 2006

Reenpaa Medal, Finnish Cultural Foundation, 2006

AAAS Award for Public Understanding of Science and Technology, 2004

"for his excellence in communicating complex scientific ideas, and their implications for society, to the general public and policy-makers, while actively engaged in a demanding and aggressive research program."

Research!America Award for Sustained Leadership at the National Level, 2004

Lila Gruber Cancer Award, American Academy of Dermatology, 2004

Time Magazine, List of "100 Most Influential People in the World Today," 2004

Josiah Willard Gibbs Prize Lecturer, American Mathematical Society, 2004

American Scientist of the Year Award, R&D Magazine, 2003

Scientist of the Year Award, National Disease Research Interchange, 2003

Alfred Benzon Foundation Prize, Denmark, 2002

Gairdner Foundation International Award, Canada, 2002

"*for his major seminal contribution to the sequencing of the human and other genomes*"

John von Neumann Award, Society for Industrial and Applied Mathematics, Philadelphia, 2002

Special Achievement Award, Miami Nature Biotechnology Winter Symposium, 2002

City of Medicine Award, 2001, with John Sulston and Robert Waterston

Max Delbruck Medal, Berlin, 2001

J. Allyn Taylor Prize, Canada, 2001

Novartis Drew Award in Biomedical Research, 2001

Distinguished Service Award, American College of Neuropsychopharmacology, 2001

Allen Award, American Society of Human Genetics, 2000

"*to the community of scientists that carried out the Human Genome Project*", accepted on behalf of community, together with Francis Collins and Craig Venter

Beckman Prize, American Association for Lab Automation, 2000

Millennium Lecturer, The White House, October 1999

Pasarow Prize in Cancer, Robert J. and Claire Pasarow Foundation, 1998

Chiron Prize for Biotechnology, American Society for Microbiology, 1998

Phi Beta Kappa Associates Award, 1998

"*for outstanding work as a scientist*"

Woodrow Wilson Award for Public Service, Princeton University, 1998

"*the university's highest award to an alumnus of the undergraduate college*"

American Academy of Microbiology, elected 1997

Dickson Prize in Medicine, University of Pittsburgh, 1997

Class of 1960 Fellows Award, Massachusetts Institute of Technology, 1996

"*for outstanding teaching*"

Kroc Distinguished Lecturer, University of Washington, Seattle, 1996

Rhoads Memorial Award, American Association for Cancer Research, 1995

"*for excellence in cancer research*"

Herman Beerman Lecturer, Society for Investigative Dermatology, 1995

Herbert Boyer Lecturer in Genetics, University of California at San Francisco, 1995

Gladstone Distinguished Lecturer, Gladstone Institute, 1994

Ralph R. Braund Distinguished Visiting Professor, University of Tennessee, 1994

Herbert W. Dickerman Award, New York Department of Health, 1993

Christian A. Herter Distinguished Lecturer, New York University, 1993

Baker Memorial Prize for Excellence in Undergraduate Teaching, MIT, 1992

Fellow, American Association for the Advancement of Science, 1990

"*for research on the application of mathematical and statistical approaches to molecular genetics*"

MacArthur Prize Fellow, *for research in human genetics and mathematics*, 1987–1992

Rhodes Scholar, 1978–1981

Johnson Memorial Bequest, Oxford University, *for best thesis in mathematics*, June 1981

Senior Prize, Oxford University, June 1981

Valedictorian, Princeton University, June 1978

Pyne Prize, Princeton University, February 1978

"*the highest award the university confers upon an undergraduate*"

Phi Beta Kappa Award, Princeton University, June 1978

"*for highest academic achievement*"

Class of 1863 Prize and Andrew Brown Prize in Mathematics, Princeton University, 1976, 1977

U.S. Mathematical Olympiad Team, Silver Medal, 16th International Mathematical Olympiad, Erfurt, East Germany, 1974

First Place, Westinghouse Science Talent Search, 1974

GOVERNMENT SERVICE (SELECTED)

Defense Innovation Board, Office of the Secretary of Defense: Member, 2016-2020

President's Council on Jobs and Competitiveness (President's Jobs Council), Executive Office of the President: Member, 2011-2012

President's Council of Advisors on Science and Technology (PCAST), Executive Office of the President: Co-Chair, 2009-2017

Presidential Commission on the National Medal of Science: Member, 1995–2000

National Institutes of Health: Member, Advisory Committee to the Director, 1995–2000

National Cancer Advisory Board: Member, 2003–2006

National Institute of Mental Health: Member, Genetics Working Group, 1997–1998

National Center for Human Genome Research (NIH): Chair, Genome Research Review Committee, 1990–1994

National Science Foundation: Member, Advisory Committee, Biological and Behavioral Sciences, 1989–1994

National Center for Human Genome Research (NIH): Chair, Ad Hoc Study Section on New Technologies for Genome Analysis, 1989

National Library of Medicine (NIH): Chair, Ad Hoc Study Section on Analysis of Molecular Biology Data, 1988

National Institutes of Health: Chair, Subcommittee on Genetic Information, Advisory Committee on Human Genome Project, 1988

National Heart Lung and Blood Institute (NIH): Member, Special Panel on Applications of Molecular Genetics to Hypertension and Atherosclerosis, 1988

Congressional Office of Technology Assessment: Member, Panel on DNA Forensics, 1989

NON-PROFIT AND ACADEMIC BOARDS (SELECTED)

Life Science Cares: Member, Board of Advisors, 2019-2021

Society for Science & The Public: Member, Honorary Board, 2019-2021

Biden Cancer Initiative: Member, Board of Directors, 2017-2021

Harvard Kennedy School, Belfer Center for Science and International Affairs: Member, Board of Directors, 2017-2021

Parker Institute for Cancer Immunotherapy: Member, Scientific Advisory Board, 2015-2021

Global Alliance for Genomics and Health: Member, Strategic Advisory Board, 2014-2021

Innocence Project: Member, Board of Directors, 2004-2021

Ontario Institute for Cancer Research: Co-Chair, Scientific Advisory Board, 2009-2017

Salk Institute for Biological Studies: Non-Resident Fellow, 2010-2018

Ragon Institute: Member, Scientific Advisory Board, 2009-2021

Massachusetts General Hospital: Member, Research Advisory Council, 2009-2012

Boston University: Board of Trustees, 2008-2013

International Cancer Genomics Consortium: Member, Scientific Planning Committee, 2007-2008

Institute for Molecular Medicine, Finland: Member, Scientific Advisory Board, 2007–2015

Memorial Sloan Kettering Cancer Center: Member, Board of Scientific Consultants, 2001-2008

American Society of Human Genetics: Member, Board of Directors, 2001–2003

Finnish Genome Center: Member, Scientific Advisory Board, 2000–2006

The Jackson Laboratory: Member, Corporation, 1999–2004

Massachusetts General Hospital: Member, Scientific Advisory Board, 1997–2001

Task Force on Science, Health Care and the Economy: Member, 1997–present

National Heart Lung and Blood Institute: Co-chair, Panel on Genetic Resources, 1996–1997

National Cancer Institute: Co-chair, Developmental Diagnostics Working Group, 1996–1997

Dana-Farber Cancer Institute: Member, Scientific Advisory Board, 1996–2001

Joint Steering Committee for Public Policy: Chair, 1996–2001; Member, 1994–2001

Genetics Society of America: Member, Board of Directors, 1992–1997

The Jackson Laboratory: Member, Scientific Advisory Board, 1992–1997

Human Genome Organization: Governing Council, 1992-1997

National Academy of Sciences: Co-chair, Symposium on Molecular Biology and Computer Science, 1990

National Academy of Sciences: Chair, Committee on Mathematics and Molecular Biology, 1989–1990

National Academy of Sciences: Member, Committee on DNA Technology in Forensic Science, 1990–1993

National Academy of Sciences: Member, Organizing Committee for Symposium on the Frontiers of Science, 1990

Princeton University: Member, Board of Trustees, 1987–1991

Princeton University: Member, Advisory Council, Department of Mathematics, 1981–1985

EDITORIAL BOARDS (SELECTED)

Functional and Integrative Genomics, Editorial Board, 1999–2009

Annual Review of Genomics and Human Genetics, Editor, 1999–2005

Physiological Genomics, Editorial Board, 1999–2003

Computational Biology, Editorial Board, 1994–2009

Genetic Analysis: Techniques and Applications, Editorial Board, 1994–1995

Human Mutation, Editorial Board, 1993–1995

Advances in Applied Mathematics, Editorial Board, 1993–1995

Genetic Epidemiology, Editorial Board, 1991–1996

PCR Methods and Applications, Editorial Board, 1991–1995

Current Opinion in Genetics and Development, Editorial Board, 1991–1995

Human Molecular Genetics, Editorial Board, 1991–1995

Mammalian Genome, Editorial Board, 1991–2009

Genomics, Editorial Board, 1986–1999

Theoretical Population Biology, Editorial Board, 1987–1991

CORPORATE BOARDS, CONSULTING AND OTHER (SELECTED)

Codiak Biosciences: Board of Directors, 2015-2021

NEON Therapeutics: Board of Directors, 2015-2021

F-Prime Capital (formerly Fidelity Biosciences): Scientific Advisory Board, 2010-2021

Infinity Pharmaceuticals: Board of Directors, 2001-2016

Third Rock Ventures: Scientific Advisory Board, 2007-2021

Foundation Medicine, Founding Advisor, 2010-2014

Millennium Pharmaceuticals: Board of Directors, 1993–2007

Affymetrix: Scientific Advisory Board, 1995–2000

Healthcare Ventures: Member, Scientific Advisory Board, 1990–1995

Arris Pharmaceutical: Scientific Advisory Board, 1990–1997

Medigene: Chair, Scientific Advisory Board, 1990–1994

E. Dupont de Nemours: Consultant, 1988

Thinking Machines Corporation: Consultant, 1990–1994

Collaborative Research: Consultant, 1985–1987

National Broadcasting Company: Consultant on statistics and economics, 1985

Attorney General, State of Hawaii: Consultant on law and economics, 1985

Wyche, Burgess, Freeman & Parham, Atlanta, Georgia: Consultant on bidding and law, 1982

Bell Laboratories: Consultant on mathematics and statistics, 1981

Business Week Magazine: Staff reporter (AAAS Mass Media Intern Fellowship for science journalism), 1977

PUBLICATIONS

Web of Science (as of 2020):
Total publications: 639
Citations: 223,166
H-index: 208

Google Scholar (as of 2020):
Citations: 486,772
H-index: 279

BOOK

1. Lander, E.S. (1983). *Symmetric designs: an algebraic approach* (Vol. 74). New York, NY: Cambridge University Press.

EDITED BOOK

2. Lander, E.S., & Waterman, M.S. (Eds.). (1995). *Calculating the secrets of life: Contributions of the mathematical sciences to molecular biology*. Washington, DC: National Academy Press.

ARTICLES

Mathematics

3. Lander, E.S. (1981). Symmetric designs and self-dual codes. *Journal of the London Mathematical Society*, *2*(2), 193-204.

4. Lander, E.S. (1981). Characterization of biplanes by their automorphism groups. In M. Aigner & D. Jungnickel. (Eds.), *Geometries and groups* (pp. 204-218). Berlin Heidelberg, Germany: Springer-Verlag.

5. Lander, E.S. (1988). Characterizing symmetric designs by their symmetries. *Journal of Algebra*, *113*(1), 1-18.

6. Lander, E.S. (1988). Restrictions upon multipliers of an abelian difference set. *Archiv der Mathematik*, *50*(3), 241-242.

7. Arratia, R., & Lander, E.S. (1990). The distribution of clusters in random graphs. *Advances in Applied Mathematics*, *11*(1), 36-48.

8. Chernoff, H., & Lander, E.S. (1995). Asymptotic distribution of the likelihood ratio test that a mixture of two binomials is a single binomial. *Journal of Statistical Planning and Inference*, *43*(1), 19-40.

Economics

9. Farrell, J., & Lander, E.S. (1989). Competition between and within teams: The lifeboat principle. *Economics Letters*, *29*(3), 205-208.

Biology

10. Lander, E.S., & Botstein, D. (1986). Consanguinity and heterogeneity: Cystic fibrosis need not be homogeneous in Italy. *American Journal of Human Genetics*, *39*(2), 282-283. PMID: 3752091; PMCID: PMC1683934.

11. Lander, E.S., & Botstein, D. (1986). Strategies for studying heterogeneous genetic traits in humans by using a linkage map of restriction fragment length polymorphisms. *Proceedings of the National Academy of Sciences*, *83*(19), 7353-7357. PMID: 2876423; PMCID: PMC386715.

12. Lander, E.S., & Botstein, D. (1986). Mapping complex genetic traits in humans: new methods using a complete RFLP linkage map. *Cold Spring Harbor Symposia on Quantitative Biology, 51*(Pt 1), 49-62. PMID: 2884068.

13. Lander, E.S., & Green, P. (1987). Construction of multilocus genetic linkage maps in humans. *Proceedings of the National Academy of Sciences USA*, *84*(8), 2363-2367. PMID: 3470801; PMCID: PMC304651.

14. Lander, E.S., & Botstein, D. (1987). Homozygosity mapping: a way to map human recessive traits with the DNA of inbred children. *Science*, *236*(4808), 1567-1570. PMID: 2884728.

15. Green, P., Barker, D., Knowlton, R., Schumm, J., Lander, E.S., Oliphant, A., Willard, H., Akots, G., Brown, V., Gravius, T., Helms, C., Nelson, C., Parker, C., Rediker, K., Watt, D., Weiffenbach, B., & Donis-Keller, H. (1987). A genetic linkage map of chromosome 7 including the cystic fibrosis region. In: G. Mastella & P.M. Quinton (Eds.), *Cellular and Molecular Basis of Cystic Fibrosis*. San Francisco, CA: San Francisco Press.

16. Barker, D., Green, P., Knowlton, R., Schumm, J., Lander, E.S., Oliphant, A., Willard, H., Akots, G., Brown, V., Gravius, T., Helms, C., Nelson, C., Parker, C., Rediker, K., Rising, M., Watt, D., Weiffenbach, B., & Donis-Keller, H. (1987). Genetic linkage map of human chromosome 7 with 63 DNA markers. *Proceedings of the National Academy of Sciences USA*, *84*(22), 8006-8010. PMID: 2891136; PMCID: PMC299465.

17. Lander, E.S., Green, P., Abrahamson, J., Barlow, A., Daly, M.J., Lincoln, S.E., & Newburg, L. (1987). MAPMAKER: an interactive computer package for constructing primary genetic linkage maps of experimental and natural populations. *Genomics*, *1*(2), 174-181. PMID: 3692487.

18. Donis-Keller, H., Green, P., Helms, C., Cartinhour, S., Weiffenbach, B., Stephens, K., Keith, T.P., Bowden, D.W., Smith, D.R., Lander, E.S., Botstein, D., Akots, G., Rediker, K.S., Gravius, T., Brown, V.A., Rising, M.B., Parker, C., Powers, J.A., Watt, D.E., Kauffman, E.R., Bricker, A., Phipps, P., Muller-Kahle, H., Fulton, T.R., Ng, S., Schumm, J.W., Braman, J.C., Knowlton, R.G., Barker, D.F., Crooks, S.M., Lincoln, S., Daly, M.J., & Abrahamson, J. (1987). A genetic linkage map of the human genome. *Cell*, *51*(2), 319-337. PMID: 3664638.

19. Lincoln, S.E., & Lander, E.S. (1987). Constructing genetic linkage maps with MAPMAKER: A tutorial and reference manual. *Whitehead Institute Technical Report*, 107.

20. Lander, E.S. (1987). The new human genetics: Mapping inherited diseases. *Princeton Alumni Weekly*, (March 25), 10-16.

21. Lander, E.S., & Waterman, M.S. (1988). Genomic mapping by fingerprinting random clones: a mathematical analysis. *Genomics*, *2*(3), 231-239. PMID: 3294162.

22. Chang, C., Bowman, J.L., DeJohn, A.W., Lander, E.S., & Meyerowitz, E.M. (1988). Restriction fragment length polymorphism linkage map for Arabidopsis thaliana. *Proceedings of the National Academy of Sciences USA*, *85*(18), 6856-6860. PMID: 2901107; PMCID: PMC282077.

23. Dracopoli, N.C., Stanger, B.Z., Ito, C.Y., Call, K.M., Lincoln, S.E., Lander, E.S., Housman, D.E. (1988). A genetic linkage map of 27 loci from PND to FY on the short arm of human chromosome I. *American Journal of Human Genetics*, *43*(4), 462-470. PMID: 2902785; PMCID: PMC1715484.

24. Lander, E.S., & Lincoln, S.E. (1988). The appropriate threshold for declaring linkage when allowing sex-specific recombination rates. *American Journal of Human Genetics*, *43*(4), 396-400. PMID: 3177382; PMCID: PMC1715500.

25. Paterson, A.H., Lander, E.S., Hewitt, J.D., Peterson, S., Lincoln, S.E., & Tanksley, S.D. (1988). Resolution of quantitative traits into Mendelian factors by using a complete linkage map of restriction fragment length polymorphisms. *Nature*, *335*(6192), 721-726. PMID: 2902517.

26. Lander, E.S. (1988). Splitting schizophrenia. *Nature*, *336*(6195), 105-106. PMID: 2903447.

27. Lander, E.S. (1988). Mapping complex genetic traits in humans. In: K. Davies (Ed.), *Genome analysis: A practical approach* (pp. 171-188). Oxford: IRL Press.

28. Lander, E.S. (1988). Restriction fragments: Their properties and uses. In: M. Waterman (Ed.), *Mathematical methods for DNA sequences* (pp. 35–52). Boca Raton, FL: CRC Press.

29. Hulbert, S.H., Ilott, T.W., Legg, E.J., Lincoln, S.E., Lander, E.S., & Michelmore, R.W. (1988). Genetic analysis of the fungus, Bremia lactucae, using restriction fragment length polymorphisms. *Genetics*, *120*(4), 947-958. PMID: 2906309; PMCID: PMC1203586.

30. Lander, E.S., Mesirov, J.P., & Taylor, W.J. (1988). Protein sequence comparison on a data parallel computer. *Proceedings of the 1988 International Conference on Parallel Processing, August 15-19, 1988 / sponsored by Department of Electrical Engineering, Penn State University*.

31. Lander, E.S., & Botstein, D. (1989). Mapping mendelian factors underlying quantitative traits using RFLP linkage maps. *Genetics*, *121*(1), 185-199. PMID: 2563713; PMCID: PMC1203601.

32. Pato, C.N., Lander, E.S., & Schulz, S.C. (1989). Prospects for the genetic analysis of schizophrenia. *Schizophrenia Bulletin*, *15*(3), 365-372. PMID: 2683037.

33. Lander, E.S. (1989). DNA fingerprinting on trial. *Nature*, *339*(6225), 501-505. PMID: 2567496.

34. Lander, E.S. (1989). Population genetic considerations in the forensic use of DNA typing. *Banbury Report*, *32*, 143-156.

35. Lander, E.S., & Daly, M.J. (1989). Genetic mapping of the cystic fibrosis region: Multipoint linkage analysis in two-generation pedigrees. In: R.C. Elston, M.A. Spence, S.E. Hodge, & J.W. MacCluer (Eds.), *Genetic Analysis Workshop 6: Multipoint Mapping and Linkage Based upon Affected Pedigree Members.* New York: Alan R. Liss.

36. Lander, E.S., Mesirov, J.P., & Taylor, W.J. (1989). Study of protein sequence comparison metrics on the Connection Machine CM-2. *The Journal of Supercomputing*, *3*(4), 255-269.

37. Lander, E.S. (1989). Genetic mapping of polygenic factors causing diabetes in inbred rodent strains. In: *Nordisk Insulin Symposium No. 3: Genes and Gene Products in the Development of Diabetes Mellitus – Basic and Clinical Aspects*, *Oslo, Norway*. Amsterdam: Elsevier Publishers.

38. Accili, D., Frapier, C., Mosthaf, L., McKeon, C., Elbein, S.C., Permutt, M.A., Ramon, E., Lander, E.S., Ullrich, A., & Taylor, S.I. (1989). A mutation in the insulin receptor gene that impairs transport of the receptor to the plasma membrane and causes insulin-resistant diabetes. *The EMBO Journal*, *8*(9), 2509-2517. PMID: 2573522; PMCID: PMC401244.

39. Lander E.S., & Botstein, D. (1989). Accurate and efficient mapping of quantitative trait loci. In: T. Helentjaris & B. Burr (Eds.), *Development and Application of Molecular Markers in Problems in Plant Genetics; Current Communications in Molecular Biology* (pp. 89-96). Cold Spring Harbor, NY: Cold Spring Harbor Press.

40. Jones, R., Taylor, W.J., Zhang, X., Mesirov, J.P., & Lander, E.S. (1990). Protein sequence comparison on the Connection Machine CM-2. In *Computers and DNA: Proceedings of the Interface Between Computation Science and Nucleic Acid Sequencing Workshop, Dec 12-16, 1988*. Redwood City, Calif.: Addison-Wesley Pub. Co.

41. Lander, E.S., & Lodish, H. (1990). Mitochondrial diseases: gene mapping and gene therapy. *Cell*, *61*(6), 925-926. PMID: 2190693.

42. Chakravarti, A., & Lander, E.S. (1990). Genetic approaches to the dissection of complex diseases. *Banbury Report*, *33*, 307-315.

43. Immerman, N., & Lander, E.S. (1990). Describing graphs: A first-order approach to graph canonization. In A.L. Selman (Ed.), *Complexity Theory Retrospective* (pp. 59-81). New York, NY: Springer-Verlag.

44. Paterson A.H., Lander, E.S., & Tanksley, S.D. (1990). Mapping QTLs affecting agriculturally important traits: Some examples from the tomato. In: J.E. Womack (Ed.), *Mapping the Genomes of Agriculturally Important Animals*. Cold Spring Harbor, NY: Cold Spring Harbor Press.

45. MacMurray, A.J., Weaver, A., Shin, H.S., & Lander, E.S. (1991). An automated method for DNA preparation from thousands of YAC clones. *Nucleic Acids Research*, *19*(2), 385-390. PMID: 2014175; PMCID: PMC333606.

46. Paterson, A.H., Damon, S., Hewitt, J.D., Zamir, D., Rabinowitch, H.D., Lincoln, S.E., Lander, E.S., & Tanksley, S.D. (1991). Mendelian factors underlying quantitative traits in tomato: comparison across species, generations, and environments. *Genetics*, *127*(1), 181-197. PMID: 1673106; PMCID: PMC1204303.

47. Lander, E.S., & Green, P. (1991). Counting algorithms for linkage: correction to Morton and Collins. *Annals of Human Genetics*, *55*(Pt. 1), 33-38. PMID: 2042933.

48. Lander, E.S. (1991). Molecular Biology: The new frontier for computational science. *Very Large Scale Computation in the 21st Century*, *25*, 138.

49. Green, P., & Lander, E.S. (1991). Forensic DNA tests and Hardy-Weinberg equilibrium. *Science*, *253*(5023), 1038-1039. PMID: 17775346.

50. Lander, E.S. (1991). Research on DNA typing catching up with courtroom application. *American Journal of Human Genetics*, *48*(5), 819-823. PMID: 1760000; PMCID: PMC1683053.

51. Lander, E.S. (1991). Research on DNA typing validated in the literature [Reply]. *American Journal of Human Genetics 49*, 899-903.

52. Jacob, H.J., Lindpaintner, K., Lincoln, S.E., Kusumi, K., Bunker, R.K., Mao, Y.P., Ganten, D., Dzau, V.J., & Lander, E.S. (1991). Genetic mapping of a gene causing hypertension in the stroke-prone spontaneously hypertensive rat. *Cell*, *67*(1), 213-224. PMID: 1655275.

53. Arratia, R., Lander, E.S., Tavaré, S., & Waterman, M.S. (1991). Genomic mapping by anchoring random clones: A mathematical analysis. *Genomics*, *11*(4), 806-827. PMID: 1783390.

54. Lander, E.S., Langridge, R., & Saccocio, D.M. (1991). Computing in molecular biology: mapping and interpreting biological information. *Computer*, *24*(11), 6-13.

55. Dietrich, W., Katz, H., Lincoln, S.E., Shin, H.S., Friedman, J., Dracopoli, N.C., & Lander, E.S. (1992). A genetic map of the mouse suitable for typing intraspecific crosses. *Genetics*, *131*(2), 423-447. PMID: 1353738; PMCID: PMC1205016.

56. Stuber, C.W., Lincoln, S.E., Wolff, D.W., Helentjaris, T., & Lander, E.S. (1992). Identification of genetic factors contributing to heterosis in a hybrid from two elite maize inbred lines using molecular markers. *Genetics*, *132*(3), 823-839. PMID: 1468633; PMCID: PMC1205218.

57. Jacob, H.J., Pettersson, A., Wilson, D., Mao, Y., Lernmark, A., & Lander, E.S. (1992). Genetic dissection of autoimmune type I diabetes in the BB rat. *Nature Genetics*, *2*(1), 56-60. PMID: 1303251.

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