

Pardis C. Sabeti

**Professor, Harvard University, Systems Biology, Organismic and Evolutionary Biology;
Professor, Harvard T.H. Chan School of Public Health, Immunology and Infectious
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EDUCATION

- Harvard Medical School** 2000-2006
M.D. *summa cum laude*. Dissertation: Identifying Natural Selection in the Human Genome
- University of Oxford** 1997-2002
D.Phil. Biological Anthropology. Dissertation: The effects of natural selection and recombination on genetic diversity in humans: An investigation of *Plasmodium falciparum* malaria in African populations
M.Sc. Human Biology. Dissertation: DNA: An Alternative Record of African American History
- Massachusetts Institute of Technology** 1993-1997
B.S. in Biology. GPA: 5.0/5.0.

RESEARCH

Harvard University, Center for Systems Biology, Department of Organismic and Evolutionary Biology, Broad Institute of MIT and Harvard

January 2008-present. My lab's goals are to develop new analytical and genomic methods to study evolutionary adaptation and genetic diversity in humans and pathogens, with three current research foci: (1) Identifying and characterizing human genetic changes important for health and survival; and (2) Investigating genetic diversity in pathogens such as Lassa, Ebola and Zika virus, and *Babesia microti*, towards improved diagnostics, surveillance, and interventions, and (3) Developing novel tools to detect, diagnose, and track microbes causing human morbidity and mortality.

Broad Institute of MIT and Harvard

October 2000 – Dec 2007. Doctoral and Post-doctoral research with Professor Eric Lander. My research focused on: (1) Developing methodology and software to detect natural selection in genome-wide studies, (2) Scanning the human genome for evidence of natural selection with the International Haplotype Map Consortium, and (3) Developing a genome-wide variation map for *P. falciparum* malaria.

University of Oxford

October 1997 – August 2000. Graduate research with Professor Ryk Ward (deceased) and Professor Dominic Kwiatkowski. My research focused on examining genetic diversity in Africans and host susceptibility to malaria, and developing new algorithms to study natural selection.

Massachusetts Institute of Technology

June 1994 – June 1997. Undergraduate research with Professor David Bartel. My research focused on determining the optimal length for molecules in the starting pool for catalytic RNA selection.

AWARDS & HONORS (SELECTED)

Richard Lounsbery Award, US and French National Academy of Science, 2017
Blavatnik National Award Finalist, 2016 & 2017
Howard Hughes Medical Institute Investigator, 2015
Amherst College, Honorary Degree, 2015
TIME's 100 Most Influential People, 2015

TIME Person of the Year, one of the scientist 'Ebola Fighters', 2014
The Vilcek Prize for Creative Promise in Biomedical Science, 2014
National Geographic Emerging Explorer, 2013-present
Ellis Island Medal of Honor, 2013
Smithsonian American Ingenuity Award for Natural Science, 2012
World Economic Forum, Young Global Leader, 2012-present
Grinnell College, Honorary Doctorate Degree, 2011
NIH Innovator Award, 2009-present
David and Lucille Packard Fellowship in Science and Engineering, 2008-2013
Burroughs Wellcome Career Award in Biomedical Sciences, 2006-2013
Damon Runyon Cancer Research Fellowship, 2004-2006
L'Oreal for Women in Science Award, 2004-2005
Paul and Daisy Soros Fellowship for New Americans, 2001-2003
Rhodes Scholarship, 1997-2000

TEACHING/ADVISING (SELECTED)

Harvard University Courses. Life Sciences 1B (LS1B): Genetics, Genomics, and Evolution, *Spring 2013-present* ~450 person introductory course currently co-taught with Hopi Hoekstra and Andrew Berry; OEB152/242: Population Genetics, *Spring 2009-2011*. I have developed the Greg Feldman Lifeboat program for HMS Transitions to Wards, 2013-present.

Against All Odds: Inside Statistics. Hosted a 32-part video series on statistics with the Annenberg Foundation and Chedd-Angier Productions. The course is publicly available and included in curriculum for high school AP and college level statistics courses since 2014. I continue to engage and video conference with thousands of students and to build additional curriculum.

African Center of Excellence for Genomics of Infectious Disease (ACEGID). My lab has partnered with Redeemer's University in Nigeria to enhance graduate education for genomics of infectious disease in West Africa. Through ACEGID we run a ~2-month summer program at Harvard and the Broad Institute for scientists and physicians, and have already trained 76 scientists from 6 countries. We also run trainings in West Africa.

PROFESSIONAL ASSOCIATIONS/SERVICE (SELECTED)

World Economic Forum. Young Global Leader, 2012-2018; Global Agenda Council on Personalized and Precision Medicine, 2012-2014.

National Academy of Science. Committee on Women in Science, Engineering and Medicine, 2007-2012.

Peer-Review. Referee for many journals including *Nature*, *Science*, *Cell*, *Genome Research*, *PLoS Biology*, *PLoS Genetics*, *New England Journal of Medicine*, *Human Molecular Genetics*, *Molecular Biology and Evolution*, *Nature Genetics*, *PLoS One*, and *American Journal of Human Genetics*.

Massachusetts Institute of Technology Corporation (Board of Trustees). Member of the Corporation, 1999-2004. Member of Visiting Committees for Humanities, 1999-2004 (Co-Chair 2003), Biological Engineering, 1999-2005, and Libraries 2000-2002.

GRANTS/FELLOWSHIPS/CONTRACTS (SELECTED CURRENT)

NIH/NHGRI 1UM1HG009435 - Comprehensive Functional Characterization and Dissection of Noncoding Regulatory Elements and Human Genetic Variation. PI: Sabeti (Broad). (09/12/2017-06/30/2021). This project aims to apply large-scale functional characterization methods to directly test over 3% of the human genome for cis-regulatory activity, to identify regulatory elements in our genome, probe how they function, and link them to human health and disease.

NIH/NIAID 1R01AI114855-01 – Elucidating Genetic Determinants of Resistance to Ebola and Lassa Hemorrhagic Fever PI: PI: Sabeti (Broad). (01/01/2015 – 12/31/2019) This project aims to find host genetic factors driving resistant to Ebola and Lassa virus using a genome-wide association study approach in West Africa.

NIH/NIAID H3Africa 5U01HG007480-02 – Host and Microbial Genetic Determinants of Febrile Illness in West Africa Subcontract PI: Sabeti (Broad); PI: Christian Happi

(Redeemer's University). (05/01/2014 – 4/31/2019) This project aims to use metagenomic sequencing to uncover the microbial cause of undiagnosed acute febrile illness in West Africa.

NIH/NIAID U19AI110818 – Infectious Disease Genomics: Pathogen Evolution, Emergence, and Host Interactions. Viral PI: Sabeti (Broad); PI: Bruce Birren (Broad). (04/01/2019 – 03/31/2024) This project aims to establish a center employing powerful, cutting edge technologies to probe the biology of a variety of dangerous pathogens and their interactions with their hosts.

HHMI Investigator – Evolutionary Forces in Humans and Pathogens (09/01/2015 - 08/31/2020). HHMI Investigator awards provide biomedical researchers with flexible support necessary to move their research in creative new directions

PUBLICATIONS (SELECTED LEAD/SENIOR)

1. **Sabeti PC**, Unrau PJ, Bartel DP. Accessing rare activities from random RNA sequences: the importance of the length of molecules in the starting pool. *Chemistry & Biology*. 1997;4(10):767-74. PMID: 9375255.
2. **Sabeti P**, Usen S... Kwiatkowski D. CD40L association with protection from severe malaria. *Genes and Immunity*. 2002;3(5):286-91. PMID: 12140747.
3. **Sabeti PC**, Reich DE, ... Lander ES. Detecting recent positive selection in the human genome from haplotype structure. *Nature*. 2002;419(6909):832-7. PMID: 12397357.
4. **Sabeti PC**, Walsh E, ... Lander ES. The case for selection at CCR5-Delta32. *PLoS Biology*. 2005;3(11):e378. PMID: 16248677.
5. **Sabeti PC**, Schaffner SF, ... Lander ES. Positive natural selection in the human lineage. *Science*. 2006;312(5780):1614-20. PMID: 16778047.
6. **Sabeti PC**, Varilly P, ... Lander ES, and the International Haplotype Map Consortium. Genome-wide detection and characterization of positive selection in human populations. *Nature*. 2007;449(7164):913-8. PMID: 17943131.
7. Volkman SK, **Sabeti PC**, ... Wirth DF. A genome-wide map of diversity in *Plasmodium falciparum*. *Nature Genetics*. 2007;39(1):113-9. PMID: 17159979.
8. Grossman SR, Shlyakhter I, ... **Sabeti PC**. A composite of multiple signals distinguishes causal variants in regions of positive selection. *Science*. 2010;327(5967):883-6. PMID: 20056855.
9. Broadbent KM, Park D, ... **Sabeti PC**, Rinn JL. A global transcriptional analysis of *Plasmodium falciparum* malaria reveals a novel family of telomere-associated lncRNAs. *Genome Biology*. 2011;12(6):R56. PMID: 21689454.
10. Reshef DN, Reshef ... Mitzenmacher M, **Sabeti PC**. Detecting novel associations in large data sets. *Science*. 2011;334(6062):1518-24. PMID: 22174245.
11. Van Tyne D, Park DJ, ... Volkman SK, **Sabeti PC**. Identification and functional validation of the novel antimalarial resistance locus PF10_0355 in *Plasmodium falciparum*. *PLoS Genetics*. 2011;7(4):e1001383. PMID: 21533027.
12. Andersen KG, Shlyakhter I, ... **Sabeti PC**. Genome-wide scans provide evidence for positive selection of genes implicated in Lassa fever. *Philosophical Transactions of the Royal Society of London Series B, Biological Sciences*. 2012;367(1590):868-77. PMID: 22312054.
13. Gire SK, Stremlau M, ... **Sabeti PC**. Epidemiology. Emerging disease or diagnosis? *Science*. 2012;338(6108):750-2. PMID: 23139320.
14. Sealfon R, Gire S, ... **Sabeti PC**. High depth, whole-genome sequencing of cholera isolates from Haiti and the Dominican Republic. *BMC Genomics*. 2012;13:468. PMID: 22963323.
15. Vitti JJ, Cho MK, Tishkoff SA, **Sabeti PC**. Human evolutionary genomics: ethical and interpretive issues. *Trends in Genetics : TIG*. 2012;28(3):137-45. PMID: 22265990.
16. Brown EA, Ruvolo M, **Sabeti PC**. Many ways to die, one way to arrive: how selection acts through pregnancy. *Trends in Genetics : TIG*. 2013. PMID: 23566676.
17. Grossman SR, Andersen KG, ... **Sabeti PC**, (and The 1000 Genomes Consortium). Identifying recent adaptations in large-scale genomic data. *Cell*. 2013;152(4):703-13. PMID: 23415221.
18. Kamberov YG, Wang S, ... Morgan BA, **Sabeti PC**. Modeling recent human evolution in mice by expression of a selected EDAR variant. *Cell*. 2013;152(4):691-702. PMID: 23415220.
19. Karlsson EK, Harris JB, ... **Sabeti PC**, Larocque RC. Natural selection in a bangladeshi population from the cholera-endemic ganges river delta. *Science Translational Medicine*. 2013;5(192):192ra86. PMID: 23825302.

20. Vitti JJ, Grossman SR, **Sabeti PC**. Detecting natural selection in genomic data. *Annual review of genetics*. 2013;47:97-120. PMID: 24274750.
21. Karlsson EK, Kwiatkowski DP, **Sabeti PC**. Natural selection and infectious disease in human populations. *Nature Reviews Genetics*. 2014;(6):379-93. doi: 10.1038/nrg3734. PMID: 24776769
22. Gire SK, Goba A, ... Kahn SH, **Sabeti PC**. Genomic surveillance elucidates Ebola virus origin and transmission during the 2014 outbreak. *Science*. 2014;345(6202):1369-72. doi: 10.1126/science.1259657. PMID: 25214632.
23. Schieffelin JS, Shaffer JG, ... **Sabeti PC**, Khan SH, Garry RF; the KGH Lassa Fever Program, the Viral Hemorrhagic Fever Consortium, and the WHO Clinical Response Team. Clinical Illness and Outcomes in Patients with Ebola in Sierra Leone. *N Engl J Med*. 2014;371(22):2092-2100. PMID: 25353969
24. Matranga CB, Andersen KG, ... Levin JZ, **Sabeti PC**. Enhanced methods for unbiased deep sequencing of Lassa and Ebola RNA viruses from clinical and biological samples. *Genome Biol*. 2014; 15(11):519. PMID: 25403361
25. Yozwiak NL, Schaffner SF, **Sabeti PC**. Data sharing: Making outbreak research open access. *Nature*. 2015; 518(7540):477-9. PMID: 25719649
26. Sealfon RS, Lin MF, Jungreis I, Wolf MY, Kellis M, **Sabeti PC**. FRESCO: Finding regions of excess synonymous constraint in diverse viruses. *Genome Biol*. 2015; 16:38. PMID: tbd
27. Stremlau MH, Andersen KG, ... **Sabeti PC**, Happi CT. Discovery of Novel Rhabdoviruses in the Blood of Healthy Individuals from West Africa. *PLoS neglected tropical diseases*. 2015; 9(3):e0003631. PMID: 25781465.
28. Baniecki ML, Faust A, ... **Sabeti PC**. Development of a single nucleotide polymorphism barcode to genotype *Plasmodium vivax* infections. *PLoS neglected tropical diseases*. 2015; 9(3):e0003539. PMID: 25781890.
29. Park DJ, Dudas G, ... Garry RF, **Sabeti PC**. Ebola Virus Epidemiology, Transmission, and Evolution during Seven Months in Sierra Leone. *Cell*. 2015; 161:1516-1526. PMID: 26091036
30. Andersen KG, Shapiro BJ, ... Garry RF, **Sabeti PC**. Whole genome-sequencing from clinical and field samples uncovers ancient origins and intra-host evolution of Lassa virus. *Cell*. 2015 (4):738-50. PMID: 26276630
31. Colubri A, Silver T, Fradet T, Retzepi K, Fry B, Sabeti P. Transforming Clinical Data into Actionable Prognosis Models: Machine-Learning Framework and Field-Deployable App to Predict Outcome of Ebola Patients. *PLoS Negl Trop Dis*. 2016 10(3):e0004549. PMID: 26991501
32. Tewhey R, Kotliar D, ... **Sabeti PC**. Direct Identification of Hundreds of Expression-Modulating Variants using a Multiplexed Reporter Assay. *Cell*. 2016 165(6):1519-29. PMID: 27259153
33. Folarin OA, Ehichioya D, ... **Sabeti PC**, Happi CT. Ebola Virus Epidemiology and Evolution in Nigeria. *J Infect Dis*. 2016 Jul 4. pii: jiw190. PMID: 27377746
34. Wohl S, Schaffner SF, **Sabeti PC**. Genomic Analysis of Viral Outbreaks. *Annu Rev Virol*. 2016 Aug 3. PMID: 27501264
35. Lemieux JE, Tran AD, ... **Sabeti PC**. A global map of genetic diversity in *Babesia microti* reveals strong population structure and identifies variants associated with clinical relapse. *Nat Microbiol*. 2016 1(7):16079. PMID: 27572973
36. Diehl WE, Lin AE, ... **Sabeti PC**, Luban J. Ebola Virus Glycoprotein with Increased Infectivity Dominated the 2013-2016 Epidemic. *Cell*. 2016 Nov 3;167(4):1088-1098.e6. PMID: 27814506
37. Reshef YA, Reshef DN, Finucane HK, **Sabeti PC**, Mitzenmacher M. Measuring Dependence Powerfully and Equitably. *Journal of Machine Learning Research* 17 (2016) 1-63.
38. Metsky HC, Matranga CB, ... MacInnis BL, **Sabeti PC**. Zika virus evolution and spread in the Americas. *Nature*. 2017 Jun 15;546(7658):411-415. PMID: 28538734
39. Barnes KG, Kindrachuk J, ... **Sabeti PC**, Chertow DS. Evidence of Ebola Virus Replication and High Concentration in Semen of a Patient During Recovery. *Clin Infect Dis*. 2017 Oct 15;65(8):1400-1403. PMID: 28582513
40. Piantadosi A, Kanjilal S, ... **Sabeti PC**. Rapid detection of Powassan virus in a patient with encephalitis by metagenomic sequencing. *Clin Infect Dis*. 2017 Sep 13. PMID: 29020227
41. Reshef DN, Reshef YA, **Sabeti PC**, Mitzenmacher M. An empirical study of the maximal and total information coefficients and leading measures of dependence. *Annals of Applied Statistics*. 2018 Volume 12, Number 1 (2018), 123-155.
42. Okokhere P, Colubri A, ... **Sabeti PC**. Clinical and laboratory predictors of Lassa fever outcome in a dedicated treatment facility in Nigeria: a retrospective, observational cohort study. *Lancet Infect Dis*. 2018 Jun;18(6):684-695. PMID: 29523497

43. Myhrvold C, Freije CA, ... **Sabeti PC**. Field-deployable viral diagnostics using CRISPR-Cas13. *Science*. 2018 Apr 27;360(6387):444-448. PMID: 29700266
44. Siddle KJ, Eromon P, ... **Sabeti PC**, Happi CT. Genomic Analysis of Lassa Virus during an Increase in Cases in Nigeria in 2018. *N Engl J Med*. 2018 Nov 1;379(18):1745-1753. PMID: 30332564
45. Metsky HC, Siddle KJ, ... **Sabeti PC**, Matranga CB. Capturing sequence diversity in metagenomes with comprehensive and scalable probe design. *Nat Biotechnol*. 2019 Feb;37(2):160-168. PMID: 30718881

MISCELLANEOUS INFORMATION

Citizenship: Naturalized US citizen, born in Iran.

Languages: Fluent English and Farsi, proficient in French.

High School, University, and Graduate additional notes: Trinity Preparatory School Valedictorian, National Merit Scholar, MIT Class of 1997 President, MIT Varsity Tennis, MIT JV Squash, MIT Novice Crew Coxswain, Coxswain for Egyptian National Team 2 years for Head of the Charles, New College Oxford Graduate Student Council

Music: Lead singer, bass player, and writer for Thousand Days. Founder of the record label Turkana Boy Records.