NOAH A. ROSENBERG

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EDUCATION

- 2001-2005 POSTDOC, University of Southern California, Molecular and Computational Biology
- 1998-2001 PHD, Stanford University, Biological Sciences
- 1997-1999 MS, Stanford University, Mathematics
- 1993-1997 BA, Rice University, Mathematics and Russian Studies, summa cum laude

ACADEMIC APPOINTMENTS

2014-	STANFORD PROFESSOR OF POPULATION GENETICS AND SOCIETY, Stanford University School of Humanities and Sciences
2014-	PROFESSOR, Stanford University Department of Biology
2011-2014	ASSOCIATE PROFESSOR, Stanford University Department of Biology
2009-2011	ASSOCIATE PROFESSOR, University of Michigan Depts. of Human Genetics, Ecology & Evolutionary Biology, and Biostatistics RESEARCH ASSOCIATE PROFESSOR, University of Michigan
	Life Sciences Institute and Center for Computational Medicine & Bioinformatics
2005-2009	ASSISTANT PROFESSOR, University of Michigan Depts. of Human Genetics, Ecology & Evolutionary Biology (2006-2009), and Biostatistics
	RESEARCH ASSISTANT PROFESSOR, University of Michigan Life Sciences Institute and Center for Computational Medicine & Bioinformatics

Recognition

- 2021 James F. Burgess Methods Article-of-the-Year in Health Services Research
- 2020 George C. Williams Prize, International Society for Evolution, Medicine & Public Health
- 2018 Elected Fellow, American Association for the Advancement of Science
- 2014 Stanford Professorship in Population Genetics and Society, Stanford University
- 2014 Stanford Prize in Population Genetics and Society, Stanford University
- 2010 Dean's Basic Science Research Award, University of Michigan Medical School
- 2007 Alumni Distinguished Leadership Award, Illinois Mathematics and Science Academy
- 2006-2010 Alfred P. Sloan Research Fellowship in Computational and Evolutionary Molecular Biology

2005	Biological Sciences Scholar, University of Michigan Medical School
2004-2014	Burroughs Wellcome Fund Career Award in the Biomedical Sciences
2003	The Lancet Biomedical Research Paper of the Year Award
2002-2004	National Science Foundation Postdoctoral Fellowship in Biological Informatics
2000-2001	Program in Mathematics and Molecular Biology Graduate Fellowship
1997-2000	National Defense Science and Engineering Graduate Fellowship
1997	National Science Foundation Graduate Research Fellowship Honorable Mention
1996 - 1997	Barry M. Goldwater Scholarship
1996	William Lowell Putnam Mathematical Competition top 100 students
1993-1997	Undergraduate Awards at Rice University -Phi Beta Kappa -Hubert E. Bray Prize in Mathematics -Dean's Profiles of Outstanding Undergraduates in the Humanities -Graham Stebbings College Service Award -Sallyport Award of the Association of Rice Alumni -Vice President of Student Affairs Appreciation Award

GRANT SUPPORT

CURRENT RESEARCH GRANTS

2021-2024	National Science Foundation BCS-2116322 Genealogical ancestors, admixture, and population history. Principal investigator 8/15/2021-7/31/2024.
2020-2023	National Science Foundation BCS-2017956. <i>Time transect of ancient genomes of Indigenous North Americans.</i> Principal investigator, 9/01/2020-8/31/2023.
2020-2023	France–Stanford Center for Interdisciplinary Studies. Population genetics of cancer evolution. Principal investigator, 9/01/2020-8/31/2023.
2018-2022	National Institutes of Health R01 GM131404. Scalable coalescent inference for large data sets, Co-investigator (J. Palacios, PI), 9/5/2018-6/30/2023.
2018-2022	United States–Israel Binational Science Foundation 2017024. Theory of consanguinity and its effects on genomic sharing within and between individuals. Principal investigator (multiple PI grant with S. Carmi), 10/1/2018-9/30/2023.
2010-2026	National Institutes of Health R01 HG005855. Population genetics for large-scale sequencing studies of diverse populations, 9/15/2017-7/31/2026. Advanced strategies for genotype imputation, 9/13/2010-6/30/2016. Principal investigator (administrative PI of multiple PI grant with P. Scheet, S. Zöllner).

Completed research grants

- 2020-2021 Stanford RISE COVID-19 Crisis Response Faculty Seed Grand Program. Minimizing effects of anti-vaccine sentiment on future COVID-19 dynamics. Principal investigator, 8/15/2020-12/31/2021.
- 2015-2019 National Science Foundation DBI-1458059. *ABI innovation: computational population-genetic analysis for detection of soft selective sweeps.* Principal investigator, 8/1/2015-7/31/2019.

- 2015-2019 National Science Foundation BCS-1515127.
 Using paleogenomic data to decipher genomic effects of European colonization on indigenous North Americans.
 Principal investigator, 8/1/2015-7/31/2019.
- 2015-2019 National Institutes of Health R01 GM117590. Mathematical and computational analysis for species tree inference. Co-investigator (J. Rhodes, PI), 8/1/2015-4/30/2019.
- 2015-2018 National Institute of Justice 2014-DN-BX-K015. Advanced statistical population genetics methods for forensic DNA identification. Principal investigator, 1/1/2015-12/31/2018.
- 2014-2018 France-Stanford Center for Interdisciplinary Studies. Inference of demographic history using joint genetic and linguistic analyses in Cape Verde. Principal investigator, 9/1/2014-8/31/2018.
- 2014-2018 Stanford Center for Computational, Evolutionary, and Human Genomics. Ancestry in forensic identification: a dual skeleton and genetic analysis. Principal investigator (trainee-led research grant with trainee Bridget Algee-Hewitt), 9/1/2014-8/31/2018.
- 2013-2017 Stanford Center for Computational, Evolutionary, and Human Genomics. Deleterious recessive variation and runs of homozygosity in Ashkenazi Jews. Principal investigator (trainee-led research grant with trainees Doc Edge and Amy Goldberg), 10/1/2013-9/30/2017.
- 2011-2015 National Science Foundation DBI-1146722. Novel methodologies for genome-scale evolutionary analysis of multi-locus data. Principal investigator, 7/1/2011-6/30/2015.
- 2010-2014 National Science Foundation BCS-1147534. Anthropological-genomic effects of European colonization on Native North Americans. Principal investigator, 9/15/2010-8/31/2014.
- 2004-2014 Burroughs Wellcome Fund Career Award in the Biomedical Sciences. *Efficient genome-based inference of ancestry for use in genetic association studies.* Principal investigator, 9/1/2004-8/31/2014.
- 2007-2013 National Institutes of Health R01 GM081441. *Population-genetic studies for association mapping*. Principal investigator, 5/1/2007-4/30/2013.
 - 2011 Stanford Center for Population Research. Genetic and linguistic admixture in Cape Verdean populations. Principal investigator, 9/1/2011-12/31/2011.
- 2009-2011 National Institutes of Health R01 GM081441. American Recovery and Reinvestment Act administrative supplement to *Population-genetic studies for association mapping*. Principal investigator, 8/31/2009-7/31/2011.
- 2007-2011 National Science Foundation DEB-0716904. *Theory of gene trees and species trees.* Principal investigator, 8/1/2007-7/31/2011.
- 2009-2011 University of Michigan/Israeli Universities Partnership. Genetic relationships among Jewish populations. Principal investigator, 2/1/2009-3/31/2011.
- 2006-2011 Horace H. Rackham Graduate School at the University of Michigan, Faculty Fellowship Enhancement Award. Principal investigator, 9/1/2006-8/31/2011.

- 2007-2011 National Institutes of Health R01 HL090564. Computational statistical approaches to gene-environment interaction. Co-investigator (S. Zöllner, PI), 9/20/2007-6/30/2011.
- 2009-2010 Life Sciences Institute, University of Michigan. Genetic diversity of human embryonic stem cell lines. Principal investigator (multiple PI grant with S. Morrison), 9/1/2009-12/31/2010.
- 2007-2010 University of Michigan/Israeli Universities Partnership. Genetic relationships among Jewish populations. Principal investigator, 7/1/2007-6/30/2010.
 - 2007 Horace H. Rackham Graduate School at the University of Michigan, Faculty Research Award. Principal investigator, 5/1/2007-12/31/2007.
- 2006-2010 Alfred P. Sloan Research Fellowship in Computational and Evolutionary Molecular Biology. Principal investigator, 9/16/2006-9/15/2010.
 - 2009 National Institutes of Health U01 HL084729.
 Integrated parametric and non-parametric mapping for genome-wide association studies. Coinvestigator (G. Abecasis, PI), 6/15/2006-5/31/2009.
- 2006-2007 National Science Foundation DEB-0609760. A new approach to inference of sex-biased migration from X-chromosomal and autosomal population-genetic data. Principal investigator, 4/15/2006-4/30/2007.
- 2004-2005 University of Southern California Center of Excellence in Genomic Science Pilot Project Grant in Human Genetic Variation. *Genetic structure of populations from India.* Principal investigator, 9/1/2004-8/31/2005.

GRANTS FOR EDUCATIONAL ACTIVITIES

- 2013-2014 Stanford Center for Computational, Evolutionary, and Human Genomics. Genomics and philosophy of race. Principal investigator, 9/1/2013-8/31/2014.
 - 2012 Stanford Center for Population Research. From generation to generation: the genetics of Jewish populations. Principal investigator, 9/1/2012-12/31/2012.
- 2007-2009 Paul Goldstein and Lillian Goldstein Lande Scientific Exchange Fund. Camp Evolution: a program for interaction between the Life Sciences Institute at the University of Michigan and the ecology and evolution community in Israel. Principal investigator, 1/1/2007-12/31/2009.
- 2006-2009 Horace H. Rackham Graduate School at the University of Michigan. *Population genetics workshop.* Principal investigator, 9/1/2006-12/31/2009.

SCHOLARLY ACTIVITIES AND SERVICE

SELECTED MAJOR SERVICE ACTIVITIES. Editor-in-Chief, *Theoretical Population Biology* (2013-); Editor of special issues (2013, 2020, 2022); Genome Research Review Committee study section standing member, National Human Genome Research Institute (2010-2014); Stanford Center for Computational, Evolutionary, and Human Genomics founding committee and ongoing committee service (2012-).

EDITORIAL BOARDS

- 2014- Associate Editor, Evolution, Medicine, and Public Health
- 2013- Editor-in-Chief, Theoretical Population Biology (Associate Editor, 2009-2012)
- 2010- Associate Editor, Human Biology
- 2010-2018 Associate Editor, Genetics
- 2011-2014 Associate Editor, Molecular Biology and Evolution
- 2010-2014 Associate Editor, BMC Bioinformatics
- 2008-2010 Associate Editor, American Journal of Human Genetics

EDITORIAL COORDINATION OF THEMATIC ARTICLE COLLECTIONS

- 2022 Celebrating 50 years since Lewontin's apportionment of human diversity, *Philosophical Trans*actions of the Royal Society of London B: Biological Sciences
- 2020 Fifty years of Theoretical Population Biology, Theoretical Population Biology
- 2013 From generation to generation: the genetics of Jewish populations, Human Biology
- 2013 Phylogenomics and population genomics: models, algorithms, and analytical tools, *Pacific Symposium on Biocomputing*

Advisory roles

- 2018- Advisory Board for "Humane Genetics" high school curriculum, BSCS Science Learning
- 2021 George C. Williams Prize selection committee chair, International Society for Evolution, Medicine, and Public Health
- 2020, 2021 Virtual roundtable panelist, British Academy
 - 2018 Bioinformatics & Systems Biology PhD program external review panelist, University of California, San Diego
 - 2015 Advisory Committee for the 100th Anniversary of Genetics, Genetics Society of America
 - 2015 Gilbert S. Omenn Prize selection committee, Evolution, Medicine, and Public Health Foundation
- 2011-2013 Advisory Board for the Summer Internship for Native Americans in Genomics, University of Illinois at Urbana-Champaign

NATIONAL INSTITUTES OF HEALTH REVIEW PANELS

- 2020, 2021 Genomic Innovator Special Emphasis Panel member, National Human Genome Research Institute
 - 2016 Genes, Genomes, and Genetics F08 Fellowships panelist, National Institutes of Health
 - 2015 Training Program Data Coordinating Center Special Emphasis Panel chair, National Human Genome Research Institute
 - 2013 Provocative Questions Initiative workshop panelist, National Cancer Institute
- 2010-2014 Genome Research Review Committee study section standing member, National Human Genome Research Institute
 - 2009 1000 Genomes Project Dataset Analysis Special Emphasis Panel member, National Human Genome Research Institute
 - 2009 Genomes & Genetics American Recovery and Reinvestment Act Challenge Grants ad hoc reviewer, National Institutes of Health

Additional review service

- 2010- PhD external examiner (National University of Singapore, University of Auckland)
- 2010- External referee for appointments and promotions (\sim 35; 6 countries)
- 2015- External referee for international research agency evaluations of individuals (\sim 10; 4 countries)
- 2006- Guest Associate Editor; *PLoS Genetics* (2006, 2008, 2011), *Proceedings of the National Academy of Sciences USA* (2015)
- 2004- National Science Foundation ad hoc grant reviewer (Biological Anthropology, Dimensions of Biodiversity, Evolutionary Ecology, Evolutionary Genetics, Phylogenetic Systematics, Plant Genome Research, Population and Evolutionary Processes, Systematic Biology and Biodiversity Inventories)
- 2005- Ad hoc grant reviewer for ~20 additional granting organizations (Austrian Science Fund, Banff International Research Station, Belgian National Fund for Scientific Research, Columbia University Research Initiatives in Science and Engineering, Chan-Zuckerberg Initiative, Estonian Science Fund, Finnish Academy, German Israeli Foundation, German Research Foundation, Human Frontier Science Foundation, Israel Science Foundation, Leakey Foundation, Netherlands Genomics Initiative, Oak Ridge Associated Universities, Royal Society of New Zealand, South Africa National Research Foundation, Swiss National Science Foundation, United Kingdom Biotechnology and Biological Sciences Research Council, United Kingdom Natural Environment Research Council, Wellcome Trust)
- 2004- Book proposal reviewer (Elsevier, Roberts & Company, Springer)
- 1999- Manuscript reviewer for >60 journals

CONFERENCE ORGANIZATION

- 2016 International scientific committee, "Founder populations and their contribution to biology and history: lessons from the Jewish genome," Haifa
- 2013 Organizing committee and local host, "Genomics and the philosophy of race" research cluster (Stanford University; University of California, Davis; University of California, Santa Cruz)
- 2013 Program committee, "Why we can't wait: conference to eliminate health disparities in genomic medicine," San Francisco
- 2008-2010 Program committee, Intelligent Systems for Molecular Biology conference (Evolution and Phylogeny 2008 & 2009, Population Genomics 2009 & 2010)
 - 2009 Symposium organizer, "Evolutionary biology: 150 years after the *Origin*," Life Sciences Institute, University of Michigan
- 2008, 2012 Abstract review committee, Population and Evolutionary Genetics session, American Society of Human Genetics annual meeting (session moderator 2008)
 - 2008 Program committee, Mathematics and Informatics in Evolution and Phylogeny conference, Montpellier
 - 2006 Symposium organizer, "Gene trees and species trees" session, Society for Molecular Biology and Evolution annual meeting

UNIVERSITY AND DEPARTMENTAL SERVICE

STANFORD UNIVERSITY (2011-PRESENT)

- 2023 Selection Committee, Stanford Chapter of Phi Beta Kappa
- 2022 Biology Librarian Search Committee, Stanford University Libraries
- 2021- Faculty Affiliate, Biomedical Informatics PhD program
- 2021- Faculty Affiliate, Computational and Mathematical Engineering PhD program
- 2021 External Scientific Advisory Committee for Curricular Development, Dept. of Mathematics
- 2016 Fulbright Campus Committee, Overseas Research Center

- 2014- Member, Bio-X
- 2013- Fellowships Chair, Center for Computational, Evolutionary, and Human Genomics
- 2012- Executive Committee, Center for Computational, Evolutionary, and Human Genomics
- 2012 Founding Committee, Center for Computational, Evolutionary, and Human Genomics
- 2012- Member, Taube Center for Jewish Studies
- 2011-2016 Faculty Affiliate, Stanford Center for Population Research
 - 2011- Ecology & Evolution subdepartment (many committees)
 - 2011- Department of Biology (many committees)

UNIVERSITY OF MICHIGAN (2005-2011)

- 2010-2011 Executive Committee, Training Program in Genomic Science
- 2005-2011 Member, Training Program in Genomic Science
- 2005-2011 Bioinformatics Graduate Program, Center for Genetics in Health and Medicine, Department of Ecology & Evolutionary Biology, and Department of Human Genetics (many committees)
- 2005-2007 Organizer, Population Genetics Rackham Interdisciplinary Workshop

PROFESSIONAL SOCIETIES

American Association for the Advancement of Science American Mathematical Society American Society of Human Genetics Genetics Society of America International Society for Evolution, Medicine & Public Health Society for Industrial and Applied Mathematics Society for Mathematical Biology Society for Molecular Biology and Evolution Society for the Study of Evolution

Mentorship

POSTDOCTORAL FELLOWS

- 2021- LILY AGRANAT-TAMIR. PhD from Hebrew University of Jerusalem.
- 2020-2021 JAZLYN MOONEY. PhD from University of California, Los Angeles. Current position: Assistant Professor, Dept. of Quantitative & Computational Biology, University of Southern California
- 2019-2020 AIRAM BLANCAS. PhD from Centro de Investigación de Matemáticas in Guanajuato. Current position: Assistant Professor, Dept. of Statistics, Instituto Technológico Autónomo de México.
- 2017-2020 GILI GREENBAUM. PhD from Ben Gurion University. Current position: Assistant Professor, Dept. of Ecology, Evolution & Behavior, Hebrew University of Jerusalem.
- 2015-2021 JAEHEE KIM. PhD from Stanford University. Current position: Assistant Professor, Dept. of Computational Biology, Cornell University.
- 2015-2018 LAWRENCE URICCHIO. PhD from University of California, San Francisco. Current position: Assistant Professor, Dept. of Biology, Tufts University.
- 2013-2018 BRIDGET ALGEE-HEWITT. PhD from University of Tennessee. First position: Senior Research Scientist, Ctr. for Comparative Studies in Race & Ethnicity, Stanford University.

2014-2017	NICOLAS ALCALA. PhD from University of Lausanne. Current position: Scientist, International Agency for Cancer, Lyon.
2013-2017	FILIPPO DISANTO. PhD from University of Paris 7/University of Siena. Current position: Lecturer, Dept. of Mathematics, University of Pisa.
2013-2016	OLGA KAMNEVA. PhD from University of Wyoming. First position: Staff Scientist, Affymetrix.
2012-2013	LARS ANDERSEN. PhD from University of Aarhus. Current position: Associate Professor, Dept. of Mathematics, University of Aarhus.
2009-2012	CUONG THAN. PhD from Rice University. First position: Postdoc, University of Tubingen.
2009-2012	PAUL VERDU. PhD from University of Paris 6. Current position: CNRS Faculty, Muséum National de Histoire Naturelle, Paris.
2009-2012	ERKAN BUZBAS. PhD from University of Idaho. Current position: Associate Professor, Dept. of Statistical Science, University of Idaho.
2008-2012	TREVOR PEMBERTON. DPhil from University of Sussex. First position: Assistant Professor, Dept. of Biochemistry & Medical Genetics, University of Manitoba.
2007-2008	JAMES DEGNAN. PhD from University of New Mexico. Current position: Associate Professor, University of New Mexico.
2006-2008	PAUL SCHEET. PhD from University of Washington. Current position: Professor and Chair, Dept. of Epidemiology, M. D. Anderson Cancer Center.
2005-2008	MATTIAS JAKOBSSON. PhD from Lund University. Current position: Professor, Dept. of Evolutionary Biology, Uppsala University.
2005-2006	MICHAEL BLUM. PhD from Institut National Polytechnique de Grenoble. First position: CNRS Faculty, Laboratory on Techniques for Biomedical Engineering & Com- plexity Management, University of Grenoble.

PhD students

2023-	JUAN ESTEBAN RODRIGUEZ. Ecology & Evolution, Stanford University.
	PhD major recognition: Stanford Graduate Fellowship.

- 2023- CHLOE SHIFF. Computational & Mathematical Engineering, Stanford University. PhD major recognition: NSF Graduate Research Fellowship.
- 2022- EGOR LAPPO. Ecology & Evolution, Stanford University. PhD major recognition: Stanford Graduate Fellowship.
- 2020- MAIKE MORRISON. Ecology & Evolution, Stanford University. PhD major recognition: NSF Graduate Research Fellowship, Stanford Graduate Fellowship.
- 2019- XIRAN LIU. Computational & Mathematical Engineering, Stanford University. *Computational methods and mathematical measures for population relationships*. PhD major recognition: Gene H. Golub Dissertation Award from Stanford Institute for Com-putational & Mathematical Engineering
- 2019- DANIEL COTTER. Genetics, Stanford University. *The effects of relatedness and sex-biased demographic processes on human genetic variation*. PhD major recognition: NSF Graduate Research Fellowship.
- 2017-2021 ALISSA SEVERSON. Genetics, Stanford University. *The effect of relatedness and population structure on patterns of genomic sharing.* PhD major recognition: NSF Graduate Research Fellowship. Current position: D2G Oncology.
- 2014-2018 ILANA ARBISSER. Ecology & Evolution, Stanford University. Mathematical investigations into fundamental population genetics statistics and models. First position: Cruise Automation, Inc.

- 2013-2018 ROHAN MEHTA. Ecology & Evolution, Stanford University. Mathematical modeling of genetic and cultural traits. PhD major recognition: NSF Graduate Research Fellowship Honorable Mention, Samuel Karlin Prize in Mathematical Biology from Stanford Biology, Stanford Graduate Fellowship. Current position: Postdoc, Emory University. JONATHAN KANG. Ecology & Evolution, Stanford University. 2013-2018 Analysis and application of linkage disequilibrium in population and statistical genetics. Current position: Lecturer, School of Mathematics and Science, Singapore Polytechnic. AMY GOLDBERG. Ecology & Evolution, Stanford University. 2012-2017 Mathematical and statistical approaches to elucidate recent human evolutionary history. PhD major recognition: Achievement Rewards for College Scientists Fellowship, American Association of Physical Anthropologists Sherwood Washburn Prize, Genetics Society of America James F. Crow Early Career Researcher Finalist, NSF Graduate Research Fellowship, Samuel Karlin Prize in Mathematical Biology from Stanford Biology. Current position: Assistant Professor, Dept. of Evolutionary Anthropology, Duke University. MICHAEL "DOC" EDGE. Ecology & Evolution, Stanford University. 2012-2016 Pick up the pieces: combining information from multiple genetic loci. PhD major recognition: Samuel Karlin Prize in Mathematical Biology from Stanford Biology, Stanford Graduate Fellowship. Current position: Assistant Professor, Dept. of Quantitative & Computational Biology, University of Southern California.
- 2010-2014 ETHAN JEWETT. Ecology & Evolution, Stanford University. Models and tools for studying genetic and cultural variation. PhD major recognition: Samuel Karlin Prize in Mathematical Biology from Stanford Biology. Current position: 23andMe, Inc.
- 2007-2014 NAAMA KOPELMAN. Environmental Studies, Tel Aviv University (co-supervisor Lewi Stone). *The complex genealogy of Jewish populations*. Current position: Senior Lecturer, Faculty of Sciences, Holon Institute of Technology.
- 2009-2012 CHAOLONG WANG. Bioinformatics, University of Michhigan. Statistical methods for analyzing human genetic variation in diverse populations. PhD major recognition: HHMI International Student Research Fellowship, Rackham Graduate School Predoctoral Fellowship. Current position: Professor, School of Public Health, Huazhong University of Science and Technology.
- 2008-2012 ZACHARY SZPIECH. Bioinformatics, University of Michigan. Human migration, population divergence, and the accumulation of deleterious alleles: insights from private genetic variation and whole-exome sequencing. Current position: Assistant Professor, Dept. of Biology, Penn State University
- 2006-2011 LUCY HUANG. Bioinformatics, University of Michigan. Genotype imputation in diverse populations: empirical and theoretical approaches. PhD major recognition: Rackham Graduate School Predoctoral Fellowship. Current position: Google, Inc.
- 2007-2011 MICHAEL DEGIORGIO. Bioinformatics, University of Michigan. Genetic variation and modern human origins.
 PhD major recognition: Ford Foundation Diversity Fellowship Honorable Mention, NSF Graduate Research Fellowship Honorable Mention, ProQuest Distinguished Dissertation Honorable Mention for best dissertation in the university.
 Current position: Associate Professor, Dept. of Electrical & Computer Engineering and Computer Science, Florida Atlantic University

MASTER'S STUDENTS

 2014-2016 BRIAN DONOVAN. Biology MS student and PhD student in Science Education, Stanford University.
 MS major recognition: Stanford Interdisciplinary Graduate Fellowship. Current position: Research Scientist, BSCS Science Learning.

- 2010-2011 LAURA HELMKAMP. Biostatistics MS student, University of Michigan. Current position: Data science.
- 2006-2008 JENNA (VANLIERE) CANZONIERO. Bioinformatics MS student and Medical student, University of Michigan.

Current position: Assistant Professor, Dept. of Oncology, Johns Hopkins School of Medicine

2004-2005 SAURABH MAHAJAN. Computer Science MS student, University of Southern California (cosupervisor Pragna Patel). Current position: Software industry.

UNDERGRADUATE RESEARCHERS

- 2023- MICHAEL DOBOLI. Mathematics, Stanford University.
- 2023- EMILY DICKEY. Mathematics, Stanford University.
- 2022- BRADLEY MOON. Mathematics, Stanford University.
- 2022- FRANCIS BECKERT. Mathematics, Stanford University.
- 2022- ZARIF AHSAN. Mathematics, Stanford University.
- 2022-2023 THEODORE GRESS. Ecology & Evolution, Stanford University
- 2022-2023 ANDREW LEE. Mathematics, Stanford University.
- 2022 TARUN MARTHESWARAN. Biomedical Computation, Stanford University.
- 2021-2022 MATTHEW KING. Mathematics, Stanford University.
 - 2021 ELYSSA HOFGARD. Physics, Stanford University.
 - 2021 ALESSANDRA MARANCA. Mathematics, Stanford University.
- 2018-2022 EGOR ALIMPIEV. Mathematics, Stanford University. Recognition for undergraduate research: Honorable Mention for the American Mathematical Society Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student.
- 2017-2019 ZOE HIMWICH. Mathematics, Stanford University.
- 2016-2018 HORMAZD GODREJ. Biology, Stanford University. Thesis: Detecting categories of consanguinity through X chromosomal runs of homozygosity.
- 2015-2018 ALAN AW. Mathematical & Computational Science, Stanford University. Thesis: *Mathematical and computational studies in human evolution and population genetics*. Recognition for undergraduate research: Deans' Award for Academic Achievement.
- 2014-2015 LUCAS HANSEN. Mathematical & Computational Science, Stanford University.
 - 2014 ANANYA RASTOGI. Biology/Mathematical Biology, Indian Institute of Science Education and Research, Mohali.
 - 2011 AMY GOLDBERG. Biological Anthropology and Mathematics, University of Michigan.
- 2008-2010 SHASHIR REDDY. Mathematics, University of Michigan.
- 2008-2010 IVANA JANKOVIC. Molecular & Cellular Biology, University of Michigan.
- 2006 RANDA TAO. Ecology & Evolutionary Biology, University of Michigan. Thesis: Gene and species trees under the coalescent process: analysis of discordance within five taxa. Recognition for undergraduate research: High Honors in Biology.
- 2006-2007 ZACHARY SZPIECH. Mathematics, University of Michigan.

Additional PhD rotation students

- 2023 TAMI GJORGJIEVA. Genetics, Stanford University.
- 2022 HUISHENG JULIE ZHU. Ecology & Evolution, Stanford University.
- 2021 SHAILI MATHUR. Ecology & Evolution, Stanford University.

- 2019 Alyssa Fortier. Ecology & Evolution, Stanford University.
- 2018-2019 KALEDA DENTON. Ecology & Evolution, Stanford University.
- 2013-2014 ARBEL HARPAK. Ecology & Evolution, Stanford University.
 - 2009 BRIAN METZGER. Ecology & Evolutionary Biology, University of Michigan.
 - 2007 CONNER SANDEFUR. Bioinformatics, University of Michigan.
 - 2005 JUSTIN VAN KLEIN. Bioinformatics, University of Michigan.

Additional trainee mentorship

- 2020-2021 RISHABH KAPOOR. Biology undergraduate, Stanford University (mentored teaching). Recognition: Lauren D. Weinstein Award in Science Education from Stanford Biology
- 2020-2021 YASH PERSHAD. Bioengineering undergraduate, Stanford University (mentored teaching).
 - 2013 LUCIE GATTEPAILLE. Visiting Evolutionary Biology PhD student, Uppsala University.
 - 2010 ANASTASIA WOLFF. Visiting Biology MS student, Ecole Normale Supériure, Paris.
 - 2010 ERIC KALOSA-KENYON. High school student, Pioneer High School, Ann Arbor.
- 2007, 2008 SIMINA BOCA. Visiting Biostatistics PhD student, Johns Hopkins University.

PhD committees

- 2022- ANASTASIA LYULINA. Ecology & Evolution, Stanford University.
- 2020- ROSHNI PATEL. Genetics, Stanford University.
- 2020- RACHEL UNGAR. Genetics, Stanford University.
- 2020-2023 TALIA BOROFSKY. Ecology & Evolution, Stanford University.
- 2019- JAVIER BLANCO. Ecology & Evolution, Stanford University.
- 2019- MALLORY HARRIS. Ecology & Evolution, Stanford University.
- 2019-2023 SHA JIANG. Ecology & Evolution, Stanford University.
- 2018-2023 KALEDA DENTON. Ecology & Evolution, Stanford University.*
- 2018-2023 Alyssa Fortier. Ecology & Evolution, Stanford University.*
- 2020-2022 MARGARET ANTONIO. Biomedical Informatics, Stanford University.
- 2019-2022 HAO SHEN. Ecology & Evolution, Stanford University.
- 2016-2022 GRANT KINSLER. Ecology & Evolution, Stanford University.
- 2019-2021 ELLIE ARMSTRONG. Ecology & Evolution, Stanford University.*
- 2016-2021 ELORA LÓPEZ. Marine Biology, Stanford University.
- 2014-2019 DANIEL FRIEDMAN. Ecology & Evolution, Stanford University.
- 2013-2018 ALISON FEDER. Ecology & Evolution, Stanford University.*
- 2013-2018 ARBEL HARPAK. Ecology & Evolution, Stanford University.*
- 2016-2018 NATALIE TELIS. Biomedical Informatics, Stanford University.
- 2017 JULIAN HOMBURGER. Genetics, Stanford University.[†]
- 2014-2017 ALEXIS MYCHAJLIW. Ecology & Evolution, Stanford University.
- 2012-2017 LILY BLAIR. Ecology & Evolution, Stanford University.
- 2012-2016 MIKE BRAMSON. Ecology & Evolution, Stanford University.
- 2014-2016 BRIAN DONOVAN. Science Education, Stanford University.
- 2011-2016 JEREMY HSU. Ecology & Evolution, Stanford University.
- 2016 MICHAEL MACLAREN. Ecology & Evolution, Stanford University.
- 2012-2016 SIDDHARTHA KRISHNA KUMAR. Ecology & Evolution, Stanford University.
- 2013-2015 NANDITA GARUD. Genetics, Stanford University.*

- 2014 BRIAN MAPLES. Biomedical Informatics, Stanford University.[†]
- 2014 MARK LONGO. Ecology & Evolution, Stanford University.
- 2014 OANA CARJA. Ecology & Evolution, Stanford University.
- 2014 ROBERT FURROW. Ecology & Evolution, Stanford University.
- 2012-2014 PHILIP GREENSPOON. Ecology & Evolution, Stanford University.
- 2012-2013 Zhiyuan Song. Ecology & Evolution, Stanford University.
- 2011-2013 PENG ZHANG. Bioinformatics, University of Michigan.*
- 2010-2011 MATTHEW ZAWISTOWSKI. Biostatistics, University of Michigan.*
- 2010-2011 SHYAM GOPALAKRISHNAN. Biostatistics, University of Michigan.
- 2008-2011 RAQUEL ASSIS. Bioinformatics, University of Michigan.
- 2006-2011 ETHAN ROMERO-SEVERSON. Epidemiology, University of Michigan.
- 2007-2010 NICOLE SCOTT. Human Genetics, University of Michigan.
- 2009 LIMING LIANG, Biostatistics, University of Michigan.
- 2007-2009 YUN LI, Biostatistics, University of Michigan.

2006-2009 AMANDA ZELLMER, Ecology & Evolutionary Biology, University of Michigan.

*Committee service includes research collaboration, supervision of a project, or an informal co-mentor role. † External chair.

NIH CAREER DEVELOPMENT MENTORING COMMITTEES

- 2010-2014 ERIK VOLZ, Department of Epidemiology, University of Michigan. NIH K01 AI091440: Estimation of HIV transmission dynamics using genetic sequences of virus.
- 2009-2014 CRISTEN WILLER, Department of Biostatistics, University of Michigan. NIH K99/R00 HL094535. Genetic variants associated with HDL and LDL cholesterol, and triglyceride levels.

UNDERGRADUATE ADVISING

2016- Academic Advisor for 1-5 students annually in the Computational Biology track of the Biology major, Stanford University.

TEACHING

Courses

STANFORD UNIVERSITY (2011-PRESENT)

- 2021- Seminar in Computational, Evolutionary, and Human Genomics (Bio 388; 2021, 2022)
- 2018-2020 Evolution (Bio 85; 2019, 2020)
- 2015-2017 Evolution (Bio 143; 2015, 2016, 2017)
 - 2021- Mathematical Evolutionary Biology (Bio 187, CME 187; 2021, 2022)
 - 2021 Evolutionary Medicine (Bio 89SI)
 - 2016- Advanced Topics in Mathematical Evolutionary Biology (Bio 287A; 2016, 2018, 2019)
 - 2013- Advanced Topics in Human Population Genetics (Bio 287B; 2013)
 - 2012 From Generation to Generation: The Genetics of Jewish Populations (Bio 127)
- 2011-2016 Current Topics in Population Biology, Ecology, and Evolution (Bio 302, 303, 304)

UNIVERSITY OF MICHIGAN (2005-2011)

- 2009 Ecology and Evolutionary Biology Capstone Seminar (EEB 410)
- 2006-2010 Introduction to Bioinformatics & Computational Biology (BI 527) (2-4 lectures)
- 2006-2011 Statistical Population Genetics (Biostat 664, Biostat 665/865; 2006, 2009, 2011)

WORKSHOPS AND EDUCATIONAL OUTREACH

- 2021 "How biology is becoming more mathematical," The Future of Everything radio program (recorded podcast interview about the work of the lab)
- 2015 Human Population Genetics II, The Biomedical & Life Sciences Collection, Henry Stewart Talks, London, hstalks.com/?t=BL196 (co-editor of an online course, with R Nielsen)
- 2013 Copenhagen-BGI PhD Course in Human Population Genetic Analysis, Beijing Genomics Institute, Shenzhen (day of lectures)
- 2013 Okinawa Integrative Biology Course, Okinawa Institute of Science and Technology (day of lectures)
- 2012 Centro de Ciencias Genómicas, Universidad Nacional Autónoma de México, Cuernavaca (day of lectures)
- 2008 Huron Valley Archaeological Society, Ann Arbor, Michigan (guest lecture)
- 2007 Camp Evolution III—Human Evolutionary Genetics, Ben Gurion University, Israel (week of lectures and lab activities)
- 2007 Henry Stewart Publications series on Human Population Genetics (recorded lecture)
- 2006-2010 Mathematical and Theoretical Biology Institute, Arizona State University (2-3 days of lectures and lab activities)
 - 2000 Workshop on the Analysis of Molecular Genetic Data in Population and Evolutionary Studies, Murdoch University (week of lectures and lab activities)

RESEARCH TALKS

SELECTED MAJOR LECTURES. International Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms, Taipei (2023); International Society for Forensic Genetics, Washington, DC (2022); RECOMB-Genetics conference, University of California, Los Angeles (2017); Third International Conference on Mathematical and Computational Medicine, Nationwide Children's Hospital, Columbus, OH (2016); Mathematical and Computational Evolutionary Biology conference, Montpellier (2012); Future Directions in Phylogenetics: Methods and Models, Isaac Newton Institute for Mathematical Sciences, Cambridge, United Kingdom (2007).

INVITED TALKS

- 2023 International Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms, Taipei (keynote)
- 2022 International Society for Forensic Genetics, Washington, DC (keynote)40 Years of Computational Biology at USC, Los Angeles
- 2019 Department of Biostatistics, University of Washington International Society for Applied Biological Sciences, Split, Croatia Department of Biology, San Francisco State University
- 2018 Algorithmic Challenges in Protecting Privacy for Biomedical Data, University of California, Los Angeles
- 2017 RECOMB-Genetics conference, University of California, Los Angeles (keynote)
 Institute for Human Genetics, University of California, San Francisco
 Department of Biomolecular Engineering, University of California, Santa Cruz
 "Mathematical Approaches to Evolutionary Trees and Networks," Banff International Research Station, Banff, Canada

2016	Computational Genomics Summer Institute, University of California, Los Angeles
	"Founder populations and their contribution to biology and history: lessons from the Jewish genome" conference, Haifa
	Third International Conference on Mathematical and Computational Medicine, Nationwide Chil- dren's Hospital, Columbus, OH (keynote)
	Sackler Colloquium "In the Light of Evolution X: Phylogeography," National Academy of Sciences Beckman Center
2015	Bioinformatics Program, University of California, Los Angeles
	American Mathematical Society Central Fall Sectional meeting, Loyola University, Chicago
	Institute for Bioinformatics and Evolutionary Studies, University of Idaho
2014	Program in Interdisciplinary Biological and Biomedical Sciences, University of New Mexico
	"The Race Debates" conference, Department of Philosophy, University of San Francisco
	Department of Epidemiology & Biostatistics, University of California, San Francisco
	"Genomics and Philosophy of Race" conference, Institute for Humanities Research, University of California, Santa Cruz
	Department of Biology, San Francisco State University
	Institute for Genomic Medicine, University of California, San Diego
2013	Coalescent theory conference, Université de Montreal
	Society for Molecular Biology and Evolution Annual Meeting, Chicago
	"Why we can't wait" conference on health disparities in genomic medicine, San Francisco
	Department of Biological Statistics and Computational Biology, Cornell University
	Department of Mathematics, University of Alabama, Birmingham
	Section on Statistical Genetics, University of Alabama, Birmingham
	Bioinformatics and Systems Biology Graduate Program, University of California, San Diego
	Working Group on Gene Tree/Species Tree Reconciliation, National Institute for Mathematical and Biological Synthesis, University of Tennessee
	Centro de Ciencias Genómicas, Universidad Nacional Autónoma de México, Cuernavaca
	Mathematical and Computational Evolutionary Biology conference, Montpellier (keynote)
	23andMe, Inc., Mountain View, CA
2012	Genetics Graduate Group, University of California, Davis

"30 Years of Molecular and Computational Biology at USC" conference, University of Southern California

Royal Swedish Academy of Sciences Symposium on Modern Human Genetic Variation, Stockholm Symposium on Human Genome Variation, University of California, Berkeley

- 2011 Workshop on Coancestry, Association, and Population Genomics, Institute for Pure and Applied Mathematics, University of California, Los Angeles Global Health Equity Symposium, Novartis Institutes for BioMedical Research, Cambridge, MA
- 2010 Symposium on Human Variation, European Molecular Biology Laboratory, Heidelberg American Association of Physical Anthropologists Annual Meeting, Albuquerque Department of Biology, Stanford University Genetics Graduate Program, University of Iowa Genome Center of Wisconsin, University of Wisconsin (Genomics Seminar) Phyloseminar.org (live online seminar series) Computational Biology and Bioinformatics Program, Duke University Department of Biostatistics, Columbia University
- 2009 Health Disparities Research Collaborative Admixture Workshop, Henry Ford Health System Department of Bioengineering and Therapeutic Sciences, University of California, San Francisco Department of History, University of California, Los Angeles (DNA and History Seminar) DIMACS Conference on Algorithmics in Human Population Genomics, Rutgers University Institute for Human Genetics, University of California, San Francisco OCS Molecular Biology Seminar, The MITRE Corporation, McLean, VA

2008 Department of Mathematics, University of California, Berkeley (Mathematical and Computational Biology Seminar) "Genome-wide Association: Analyze This" meeting of the Genes, Environment, and Health Initiative, National Institutes of Health, Bethesda Society of Systematic Biologists Annual Meeting, University of Minnesota Penn Bioinformatics Forum, University of Pennsylvania Program in Ecology, Evolution, and Conservation Biology, University of Illinois, Urbana-Champaign 2007 Future Directions in Phylogenetics: Methods and Models, Isaac Newton Institute for Mathematical Sciences, Cambridge, United Kingdom (keynote) Department of Anthropology, University of California, Davis Institute for Mathematical Behavioral Sciences, University of California, Irvine Santa Fe Institute, NM Symposium on Trends in Human Genetics, Puri, India National Center for Biological Sciences, Bangalore Conférences Jacques Monod on Evolutionary Genomics, Roscoff, France DNA Sampling: Strategies and Design, Musée de l'Homme, Paris Department of Epidemiology and Biostatistics, Case Western Reserve University Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania 2006 Computational and Theoretical Biology Symposium, Department of Bioengineering, Rice University Department of Ecology and Evolutionary Biology, Rice University Department of Biology, York University, Toronto Department of Statistics, Iowa State University (Mathematical Biology Seminar) American Diabetes Association Annual Meeting, Washington, DC Society for Molecular Biology and Evolution Annual Meeting, Arizona State University 2005 Workshop on Phylogenetics and Phylogeography, Mathematical Biosciences Institute, Ohio State University Workshop on Recombination Hotspots and Haplotype Structure, Mathematical Biosciences Institute, Ohio State University American Association of Physical Anthropologists Annual Meeting, Milwaukee Department of Mathematics and Statistics, University of New Mexico Center for Bioinformatics and Computational Biology, Duke University Department of Ecology and Evolutionary Biology, University of California, Los Angeles Department of Genetics, Stanford University Department of Human Genetics, University of California, Los Angeles Section of Evolution and Ecology, University of California, Davis Division of Human Biology, Fred Hutchinson Cancer Research Center, Seattle 2004 Bioinformatics Graduate Program, University of Michigan Department of Genetics, Stanford University (Annual Retreat) London Mathematical Society Symposium on Mathematical Genetics, University of Durham, United Kingdom Department of Genome Sciences, University of Washington Department of Botany and Plant Biology, University of California, Riverside 2003 Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital, Memphis Department of Biomathematics, University of California, Los Angeles Cambridge Healthtech Institute Molecular Medicine Marketplace, Santa Clara American Association for the Advancement of Science Annual Meeting, Denver The Center for the Advancement of Genomics, Rockville, MD Department of Ecology and Evolutionary Biology, University of California, Irvine 2001 Center for Statistical Genetics, University of Michigan Department of Mathematics, University of Southern California

STANFORD UNIVERSITY (2011-PRESENT)

- 2022 Data Science Initiative
- 2019 Center for Law and the Biosciences
- 2018 Biostatistics Workshop
- 2016 Bio X Undergraduate Summer Research Program
- 2014 Institute for Computational and Mathematical Engineering Stanford Center for Computational, Evolutionary, and Human Genomics
- 2013 Taube Center for Jewish Studies Biostatistics Workshop

UNIVERSITY OF MICHIGAN (2005-2011)

- 2011 Undergraduate Research Opportunities Program Peer Group
- 2010 Center for Afroamerican and African Studies (Mellon Foundation Sawyer Seminar on Ethnicity in Africa)
 Center for Computational Medicine and Bioinformatics
 Training Program in Genomic Science
 Department of Molecular and Integrative Physiology
 2009 Department of Internal Medicine (Grand Rounds)
 2008 Department of Dermatology
 Center for Computational Medicine and Bioinformatics
 2007 Department of Mathematics (Applied and Interdisciplinary Mathematics Seminar)
 2006 Department of Ecology and Evolutionary Biology
 - Life Sciences Institute (Colloquium)

PUBLICATIONS

ARTICLE COLLECTIONS EDITED

- [C1] LK Nakhleh, NA Rosenberg, T Warnow (editors). Phylogenomics and population genomics: models, algorithms, and analytical tools. *Pacific Symposium on Biocomputing* 18: 247-306 (2013). [Link]
- [C2] NA Rosenberg, SP Weitzman (editors). From generation to generation: the genetics of Jewish populations. *Human Biology* 85: 817-939 (2013). [Link]
- [C3] NA Rosenberg (editor). Fifty years of Theoretical Population Biology. Theoretical Population Biology 133: 1-180 (2020). [Link]
- [C4] MD Edge, S Ramachandran, NA Rosenberg (editors). Celebrating 50 years since Lewontin's apportionment of human diversity. *Philosophical Transactions of the Royal Society of London B: Biological Sciences* 377: 1852 (2022). [Link]

PEER-REVIEWED ARTICLES

- [1] JK Pritchard, **NA Rosenberg**. Use of unlinked genetic markers to detect population stratification in association studies. *American Journal of Human Genetics* 65: 220-228 (1999). [Link]
- [2] L Jin, ML Baskett, LL Cavalli-Sforza, LA Zhivotovsky, MW Feldman, NA Rosenberg. Microsatellite evolution in modern humans: a comparison of two data sets from the same populations. *Annals of Human Genetics* 64: 117-134 (2000). [Link]
- [3] JK Pritchard, M Stephens, NA Rosenberg, P Donnelly. Association mapping in structured populations. American Journal of Human Genetics 67: 170-181 (2000). [Link]

- [4] NA Rosenberg, E Woolf, JK Pritchard, T Schaap, D Gefel, I Shpirer, U Lavi, B Bonné-Tamir, J Hillel, MW Feldman. Distinctive genetic signatures in the Libyan Jews. Proceedings of the National Academy of Sciences USA 98: 858-863 (2001). [Link]
- [5] MM Tanaka, NA Rosenberg. Optimal estimation of transposition rates of insertion sequences for molecular epidemiology. *Statistics in Medicine* 20: 2409-2420 (2001). [Link]
- [6] NA Rosenberg, T Burke, K Elo, MW Feldman, PJ Freidlin, MAM Groenen, J Hillel, A Mäki-Tanila, M Tixier-Boichard, A Vignal, K Wimmers, S Weigend. Empirical evaluation of genetic clustering methods using multilocus genotypes from 20 chicken breeds. *Genetics* 159: 699-713 (2001). [Link]
- [7] **NA Rosenberg**. The probability of topological concordance of gene trees and species trees. *Theoretical Population Biology* 61: 225-247 (2002). [Link]
- [8] **NA Rosenberg**, M Nordborg. Genealogical trees, coalescent theory and the analysis of genetic polymorphisms. *Nature Reviews Genetics* 3: 380-390 (2002). [Link]
- [9] NA Rosenberg, JK Pritchard, JL Weber, HM Cann, KK Kidd, LA Zhivotovsky, MW Feldman. Genetic structure of human populations. Science 298: 2381-2385 (2002). [Link]
 [Current Biology scientific commentary]
 [Nature Genetics scientific commentary]
 [Science scientific commentary]
 [Lancet Biomedical Research Paper of the Year Award]
- [10] LA Zhivotovsky, NA Rosenberg, MW Feldman. Features of evolution and expansion of modern humans, inferred from genomewide microsatellite markers. *American Journal of Human Genetics* 72: 1171-1186 (2003). [Link]
 [Discover Top Science Stories of 2003]
- [11] NA Rosenberg, JK Pritchard, JL Weber, HM Cann, KK Kidd, LA Zhivotovsky, MW Feldman. Response to comment on "Genetic structure of human populations." *Science* 300: 1877 (2003). [Link]
- [12] NA Rosenberg, AG Tsolaki, MM Tanaka. Estimating change rates of genetic markers using serial samples: applications to the transposon IS 6110 in Mycobacterium tuberculosis. Theoretical Population Biology 63: 347-363 (2003). [Link]
- [13] **NA Rosenberg**. The shapes of neutral gene genealogies in two species: probabilities of monophyly, paraphyly, and polyphyly in a coalescent model. *Evolution* 57: 1465-1477 (2003). [Link]
- [14] NA Rosenberg, AE Hirsh. On the use of star-shaped genealogies in estimating coalescence times. *Genetics* 164: 1677-1682 (2003). [Link]
- [15] NA Rosenberg, L Li, R Ward, JK Pritchard. Informativeness of genetic markers for inference of ancestry. American Journal of Human Genetics 73: 1402-1422 (2003). [Link] [American Journal of Human Genetics editorial highlight]
- [16] S Ramachandran, NA Rosenberg, LA Zhivotovsky, MW Feldman. Robustness of the inference of human population structure: A comparison of X-chromosomal and autosomal microsatellites. *Human Genomics* 1: 87-97 (2004). [Link]
- [17] **NA Rosenberg**. *Distruct*: a program for the graphical display of population structure. *Molecular Ecology Notes* 4: 137-138 (2004). [Link]
- [18] MM Tanaka, NA Rosenberg, PM Small. The control of copy number of IS 6110 in Mycobacterium tuberculosis. Molecular Biology and Evolution 21: 2195-2201 (2004). [Link]
- [19] NA Rosenberg, PP Calabrese. Polyploid and multilocus extensions of the Wahlund inequality. Theoretical Population Biology 66: 381-391 (2004). [Link]
- [20] H Innan, K Zhang, P Marjoram, S Tavaré, NA Rosenberg. Statistical tests of the coalescent model based on the haplotype frequency distribution and the number of segregating sites. *Genetics* 169: 1763-1777 (2005). [Link]

- [21] M Nordborg, TT Hu, Y Ishino, J Jhaveri, C Toomajian, H Zheng, E Bakker, P Calabrese, J Gladstone, R Goyal, M Jakobsson, S Kim, Y Morozov, B Padhukasahasram, V Plagnol, NA Rosenberg, C Shah, JD Wall, J Wang, K Zhao, T Kalbfleisch, V Schulz, M Kreitman, J Bergelson. The pattern of polymorphism in *Arabidopsis thaliana*. *PLoS Biology* 3: 1289-1299 (2005). [Link]
- [22] **NA Rosenberg**. A sharp minimum on the mean number of steps taken in adaptive walks. Journal of Theoretical Biology 237: 17-22 (2005). [Link]
- [23] S Ramachandran, O Deshpande, CC Roseman, NA Rosenberg, MW Feldman, LL Cavalli-Sforza. Support from the relationship of genetic and geographic distance in human populations for a serial founder effect originating in Africa. *Proceedings of the National Academy of Sciences USA* 102: 15942-15947 (2005). [Link]
- [24] **NA Rosenberg**. Algorithms for selecting informative marker panels for population assignment. Journal of Computational Biology 12: 1183-1201 (2005). [Link]
- [25] NA Rosenberg, S Mahajan, S Ramachandran, C Zhao, JK Pritchard, MW Feldman. Clines, clusters, and the effect of study design on the inference of human population structure. *PLoS Genetics* 1: 660-671 (2005). [Link]
- [26] **NA Rosenberg**. The mean and variance of the numbers of *r*-pronged nodes and *r*-caterpillars in Yule-generated genealogical trees. Annals of Combinatorics 10: 129-146 (2006). [Link]
- [27] JH Degnan, **NA Rosenberg**. Discordance of species trees with their most likely gene trees. *PLoS Genetics* 2: 762-768 (2006). [Link]
- [28] NA Rosenberg, M Nordborg. A general population-genetic model for the production by population structure of spurious genotype-phenotype associations in discrete, admixed or spatially distributed populations. *Genetics* 173: 1665-1678 (2006). [Link]
- [29] NA Rosenberg. Standardized subsets of the HGDP-CEPH Human Genome Diversity Cell Line Panel, accounting for atypical and duplicated samples and pairs of close relatives. Annals of Human Genetics 70: 841-847 (2006). [Link]
- [30] DF Conrad*, M Jakobsson*, G Coop*, X Wen, JD Wall, NA Rosenberg[†], JK Pritchard. A worldwide survey of haplotype variation and linkage disequilibrium in the human genome. Nature Genetics 38: 1251-1260 (2006). [Link] [Nature Genetics scientific commentary]

[Nature Genetics cover article] [Nature Reviews Genetics editorial highlight]

- [31] NA Rosenberg, S Mahajan, C Gonzales-Quevedo, MGB Blum, L Nino-Rosales, V Ninis, P Das, M Hegde, L Molinari, G Zapata, JL Weber, JW Belmont, PI Patel. Low levels of genetic divergence across geographically and linguistically diverse populations from India. *PLoS Genetics* 2: 2052-2061 (2006). [Link]
- [32] **NA Rosenberg**. Statistical tests for taxonomic distinctiveness from observations of monophyly. *Evolution* 61: 317-323 (2007). [Link]
- [33] KB Schroeder, TG Schurr, JC Long, NA Rosenberg, MH Crawford, LA Tarskaia, LP Osipova, SI Zhadanov, DG Smith. A private allele ubiquitous in the Americas. *Biology Letters* 3: 218-223 (2007). [Link]
- [34] L David, NA Rosenberg, U Lavi, MW Feldman, J Hillel. Genetic diversity and population structure inferred from the partially duplicated genome of domesticated carp, *Cyprinus carpio* L. *Genetics Selection Evolution* 39: 319-340 (2007). [Link]
- [35] M Jakobsson, NA Rosenberg. The probability distribution under a population-genetic model of the number of genetic founding lineages of a population or species. *Theoretical Population Biology* 71: 502-523 (2007). [Link]
- [36] NA Rosenberg, MGB Blum. Sampling properties of homozygosity-based statistics for linkage disequilibrium. *Mathematical Biosciences* 208: 33-47 (2007). [Link]

- [37] NA Rosenberg. Counting coalescent histories. Journal of Computational Biology 14: 360-377 (2007). [Link]
- [38] MGB Blum, NA Rosenberg. Estimating the number of ancestral lineages using a maximumlikelihood method based on rejection sampling. *Genetics* 176: 1741-1757 (2007). [Link] [*Genetics* editorial highlight]
- [39] M Jakobsson, NA Rosenberg. CLUMPP: a cluster matching and permutation program for dealing with label switching and multimodality in analysis of population structure. *Bioinformatics* 23: 1801-1806 (2007). [Link]
- [40] S Wang*, CM Lewis Jr*, M Jakobsson*, S Ramachandran, N Ray, G Bedoya, W Rojas, MV Parra, JA Molina, C Gallo, G Mazzotti, G Poletti, K Hill, AM Hurtado, D Labuda, W Klitz, R Barrantes, MC Bortolini, FM Salzano, ML Petzl-Erler, LT Tsuneto, E Llop, F Rothhammer, L Excoffier, MW Feldman, NA Rosenberg[†], A Ruiz-Linares. Genetic variation and population structure in Native Americans. *PLoS Genetics* 3: 2049-2067 (2007). [Link] [2015 *PLoS Genetics* 10th Anniversary Collection]
- [41] K Zhang, NA Rosenberg. On the genealogy of a duplicated microsatellite. Genetics 177: 2109-2122 (2007). [Link]
- [42] M Jakobsson*, SW Scholz*, P Scheet*, JR Gibbs, JM VanLiere, H-C Fung, ZA Szpiech, JH Degnan, K Wang, R Guerreiro, JM Bras, JC Schymick, DG Hernandez, BJ Traynor, J Simon-Sanchez, M Matarin, A Britton, J van de Leemput, I Rafferty, M Bucan, HM Cann, JA Hardy, NA Rosenberg[†], AB Singleton. Genotype, haplotype, and copy-number in worldwide human populations. *Nature* 451: 998-1003 (2008). [Link]
- [43] **NA Rosenberg**, R Tao. Discordance of species trees with their most likely gene trees: the case of five taxa. *Systematic Biology* 57: 131-140 (2008). [Link]
- [44] JM Macpherson, J González, DM Witten, JC Davis, NA Rosenberg, AE Hirsh, DA Petrov. Nonadaptive explanations for signatures of partial selective sweeps in *Drosophila*. *Molecular Biology and Evolution* 25: 1025-1042 (2008). [Link]
- [45] O François, MGB Blum, M Jakobsson, NA Rosenberg. Demographic history of European populations of Arabidopsis thaliana. PLoS Genetics 4: e1000075 (2008). [Link]
- [46] TJ Pemberton*, M Jakobsson*, DF Conrad, G Coop, JD Wall, JK Pritchard, PI Patel, NA Rosenberg. Using population mixtures to optimize the utility of genomic databases: linkage disequilibrium and association study design in India. Annals of Human Genetics 72: 535-546 (2008). [Link]
- [47] JM VanLiere, NA Rosenberg. Mathematical properties of the r² measure of linkage disequilibrium. Theoretical Population Biology 74: 130-137 (2008). [Link]
- [48] NA Rosenberg, M Jakobsson. The relationship between homozygosity and the frequency of the most frequent allele. *Genetics* 179: 2027-2036 (2008). [Link] [*Genetics* editorial highlight]
- [49] ZA Szpiech, M Jakobsson, **NA Rosenberg**. ADZE: A rarefaction approach for counting alleles private to combinations of populations. *Bioinformatics* 24: 2498-2504 (2008). [Link]
- [50] S Ramachandran, NA Rosenberg, MW Feldman, J Wakeley. Population differentiation and migration: coalescence times in a two-sex island model for autosomal and X-linked loci. *Theoretical Population Biology* 74: 291-301 (2008). [Link]
- [51] L Huang, Y Li, AB Singleton, JA Hardy, G Abecasis, NA Rosenberg, P Scheet. Genotypeimputation accuracy across worldwide human populations. American Journal of Human Genetics 84: 235-250 (2009). [Link]
- [52] M DeGiorgio, NA Rosenberg. An unbiased estimator of gene diversity in samples containing related individuals. *Molecular Biology and Evolution* 26: 501-512 (2009). [Link]

- [53] KB Schroeder, M Jakobsson, MH Crawford, TG Schurr, SM Boca, DF Conrad, R Titotadeo, LP Osipova, LA Tarskaia, SI Zhadanov, JD Wall, JK Pritchard, RS Malhi, DG Smith, NA Rosenberg. Haplotypic background of a private allele in the Americas. *Molecular Biology and* Evolution 26: 995-1016 (2009). [Link]
- [54] JH Degnan, **NA Rosenberg**. Gene tree discordance, phylogenetic inference and the multispecies coalescent. *Trends in Ecology and Evolution* 24: 332-340. [Link]
- [55] JH Degnan, M DeGiorgio, D Bryant, NA Rosenberg. Properties of consensus methods for inferring species trees from gene trees. Systematic Biology 58: 35-54 (2009). [Link]
- [56] **NA Rosenberg**, JM VanLiere. Replication of genetic associations as pseudoreplication due to shared genealogy. *Genetic Epidemiology* 33: 479-487 (2009). [Link]
- [57] M DeGiorgio, M Jakobsson, NA Rosenberg. Explaining worldwide patterns of human genetic variation using a coalescent-based serial founder model of migration outward from Africa. Proceedings of the National Academy of Sciences USA 106: 16057-16062 (2009). [Link]
- [58] L Huang, C Wang, NA Rosenberg. The relationship between imputation error and statistical power in genetic association studies in diverse populations. American Journal of Human Genetics 85: 692-698 (2009). [Link]
 [American Journal of Human Genetics editorial highlight]
 [Nature Reviews Genetics editorial highlight]
- [59] NM Kopelman, L Stone, C Wang, D Gefel, MW Feldman, J Hillel, NA Rosenberg. Genomic microsatellites identify shared Jewish ancestry intermediate between Middle Eastern and European populations. *BMC Genetics* 10: 80 (2009). [Link]
- [60] TJ Pemberton, CI Sandefur, M Jakobsson, **NA Rosenberg**. Sequence determinants of human microsatellite variability. *BMC Genomics* 10: 612 (2009). [Link]
- [61] JT Mosher, TJ Pemberton, K Harter, C Wang, EO Buzbas, P Dvorak, C Simón, SJ Morrison, NA Rosenberg. Lack of population diversity in commonly used human embryonic stem-cell lines. New England Journal of Medicine 362: 183-185 (2010). [Link] [Nature editorial highlight]
- [62] C Wang, ZA Szpiech, JH Degnan, M Jakobsson, TJ Pemberton, JA Hardy, AB Singleton, NA Rosenberg. Comparing spatial maps of human population-genetic variation using Procrustes analysis. *Statistical Applications in Genetics and Molecular Biology* 9: 13 (2010). [Link]
- [63] NA Rosenberg, JH Degnan. Coalescent histories for discordant gene trees and species trees. Theoretical Population Biology 77: 145-151 (2010). [Link]
- [64] **NA Rosenberg**, L Huang^{*}, EM Jewett^{*}, ZA Szpiech^{*}, I Jankovic^{*}, M Boehnke. Genome-wide association studies in diverse populations. *Nature Reviews Genetics* 11: 356-366 (2010). [Link]
- [65] I Jankovic, BM vonHoldt, NA Rosenberg. Heterozygosity of the Yellowstone wolves. Molecular Ecology 19: 3246-3249 (2010). [Link]
- [66] E Borràs*, M Pineda*, I Blanco, EM Jewett, F Wang, A Teulé, T Caldés, M Urioste, C Martínez-Bouzas, J Brunet, J Balmaña, A Torres, T Ramón y Cajal, J Sanz, L Pérez-Cabornero, S Castellví-Bel, A Alonso, A Lanas, S González, V Moreno, SB Gruber, NA Rosenberg, B Mukherjee, C Lázaro, G Capellá. *MLH1* founder mutations with moderate penetrance in Spanish Lynch syndrome families. *Cancer Research* 70: 7379-7391 (2010). [Link]
- [67] TJ Pemberton, C Wang, JZ Li, NA Rosenberg. Inference of unexpected genetic relatedness among individuals in HapMap Phase III. American Journal of Human Genetics 87: 457-464 (2010). [Link] [American Journal of Human Genetics editorial highlight]

[American Journal of Human Genetics editorial highlight] [Genetics editorial highlight]

[68] M DeGiorgio^{*}, I Jankovic^{*}, **NA Rosenberg**. Unbiased estimation of gene diversity in samples containing relatives: exact variance and arbitrary ploidy. *Genetics* 186: 1367-1387 (2010). [Link]

- [69] CV Than, NA Rosenberg. Consistency properties of species tree inference by minimizing deep coalescences. Journal of Computational Biology 18: 1-15 (2011). [Link]
- [70] EO Buzbas, P Joyce, **NA Rosenberg**. Inference on the strength of balancing selection for epistatically interacting loci. *Theoretical Population Biology* 79: 102-113 (2011). [Link]
- [71] Z Yang, M Rosenthal, NA Rosenberg, S Talarico, L Zhang, C Marrs, VO Thomsen, T Lillebaek, AB Andersen. How dormant is *Mycobacterium tuberculosis* during latency? A study integrating genomics and molecular epidemiology. *Infection, Genetics and Evolution* 11: 1164-1167 (2011). [Link]
- [72] ZA Szpiech, **NA Rosenberg**. On the size distribution of private microsatellite alleles. *Theoretical Population Biology* 80: 100-113 (2011). [Link]
- [73] SM Boca, **NA Rosenberg**. Mathematical properties of F_{st} between admixed populations and their parental source populations. *Theoretical Population Biology* 80: 208-216 (2011). [Link]
- [74] M DeGiorgio, JH Degnan, NA Rosenberg. Coalescence time distributions in a serial founder model of human evolutionary history. *Genetics* 189: 579-593 (2011). [Link] [*Genetics* editorial highlight]
- [75] S Ramachandran, NA Rosenberg. A test of the influence of continental axes of orientation on patterns of human gene flow. American Journal of Physical Anthropology 146: 515-529 (2011). [Link]

[American Journal of Physical Anthropology cover article]

- [76] P Verdu, NA Rosenberg. A general mechanistic model for admixture histories of hybrid populations. Genetics 189: 1413-1426 (2011). [Link] [Genetics editorial highlight]
- [77] L Huang*, M Jakobsson*, TJ Pemberton, M Ibrahim, T Nyambo, S Omar, JK Pritchard, SA Tishkoff, NA Rosenberg. Haplotype variation and genotype imputation in African populations. *Genetic Epidemiology* 35: 766-780 (2011). [Link]
- [78] NA Rosenberg. A population-genetic perspective on the similarities and differences among worldwide human populations. *Human Biology* 83: 659-684 (2011). [Link] [Re-published in a 2020 compilation]
- [79] JH Degnan, NA Rosenberg[‡], T Stadler. The probability distribution of ranked gene trees on a species tree. *Mathematical Biosciences* 235: 45-55 (2012). [Link]
- [80] FA San Lucas, **NA Rosenberg**, P Scheet. Haploscope: a tool for the graphical display of haplotype structure in populations. *Genetic Epidemiology* 36: 17-21 (2012). [Link]
- [81] SB Reddy, **NA Rosenberg**. Refining the relationship between homozygosity and the frequency of the most frequent allele. *Journal of Mathematical Biology* 64: 87-108 (2012). [Link]
- [82] EM Jewett, **NA Rosenberg**. iGLASS: an improvement to the GLASS method for estimating species trees from gene trees. *Journal of Computational Biology* 19: 293-315 (2012). [Link]
- [83] LJ Helmkamp, EM Jewett, NA Rosenberg. Improvements to a class of distance matrix methods for inferring species trees from gene trees. *Journal of Computational Biology* 19: 632-649 (2012). [Link]
- [84] D Bryant, R Bouckaert, J Felsenstein, NA Rosenberg, A RoyChoudhury. Inferring species trees directly from biallelic genetic markers: bypassing gene trees in a full coalescent analysis. *Molecular Biology and Evolution* 29: 1917-1932 (2012). [Link]
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- [B3] NA Rosenberg. Variance-partitioning and classification in human population genetics. Pp. 399-403 in RG Winther, ed. Phylogenetic Inference, Selection Theory, and History of Science: Selected Papers of A. W. F. Edwards with Commentaries. Cambridge: Cambridge University Press (2018).

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- [H1] **NA Rosenberg**. Admixture models and the breeding systems of H. S. Jennings: a *Genetics* connection. *Genetics* 202: 9-13 (2016). [Peer-reviewed commentary] [Link]
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- [E3] **NA Rosenberg**, SP Weitzman. From generation to generation: the genetics of Jewish populations. *Human Biology* 85: 817-823 (2013). [Introduction to special issue] [Link]
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- [E6] L Lehmann, NA Rosenberg. Hamilton's rule: game theory meets coalescent theory. Theoretical Population Biology 103: 1 (2015). [Editorial] [Link]

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- [E9] NA Rosenberg. Fifty years of Theoretical Population Biology. Theoretical Population Biology 133: 1-12 (2020). [Introduction to special issue] [Link]
- [E10] NA Rosenberg. Population models, mathematical epidemiology, and the COVID-19 pandemic. Theoretical Population Biology 137: 1 (2021). [Editorial] [Link]
- [E11] NA Rosenberg, MF Boni. Mathematical epidemiology for a later age. Theoretical Population Biology 144: 81-83 (2022). [Editorial] [Link]
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- [R1] NA Rosenberg, D Nettle. Joining forces to infer human evolutionary history. Trends in Ecology and Evolution 17: 301-302 (2002). [Meeting report] [Link]
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PROBLEMS AND SOLUTIONS

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CONTRIBUTIONS TO THE ON-LINE ENCYCLOPEDIA OF INTEGER SEQUENCES OEIS.ORG

- [O1] New sequences added (2019): [A306205], [A306266], [A306292], [A306295], [A306350], [A306364], [A306390], [A306391], [A306402], [A306422], [A306423]
- [O2] New sequences added (2022): [A354468], [A354690], [A354970], [A355044], [A355108], [A355118]
- [O3] Miscellaneous edits to ~ 20 existing sequences (2019, 2022).

Abstracts and conference papers

- [A1] DM Zulman, NA Rosenberg, ZH Cuevas, DM Yaurima. Prevalence of iron deficiency anemia in the state of Campeche, Mexico. *Journal of Investigative Medicine* 51: S92 (2003). [Published abstract for unpublished paper]
- [A2] R Ronen, G Tesler, A Akbari, S Zakov, NA Rosenberg, V Bafna. Haplotype allele frequency (HAF) score: predicting carriers of ongoing selective sweeps without knowledge of the adaptive allele. *Lecture Notes in Computer Science* 9029: 276-280 (2015). [RECOMB conference paper superseded by article 120] [Link]
- [A3] RS Mehta, D Bryant, NA Rosenberg. The probability of monophyly of a sample of gene lineages on a species tree. Chapter 6, pp. 113-135 in JC Avise and FJ Ayala, eds. In the Light of Evolution, Volume X: Comparative Phylogeography. Washington, DC: National Academies Press (2017). [Conference volume republishing article 127]

Selected informational notes on publications

Undergraduate research: Articles 43, 49, 64, 65, 68, 81, 111, 142, 158, 164, 174, 175, 176, and 184 include the contributions of undergraduate researchers. Undergraduates are first author of articles 49, 65, 81, 111, 142, 158, 174, 175, 176, and 184.

Review articles: Articles 8, 54, 64, 78, 101, 118, 141, and 147 are articles that have a primary purpose of reviewing or synthesizing an area of the literature.

Software articles: Articles 17, 39, 49, 80, and 117 are articles that are structured as presentations of software packages.

Correspondence articles: Articles 65 and 98 are letters to the editor. Articles 11 and 133 are responses to letters to the editor.

Articles featured in special issues: Articles 26, 57, 75, 83, 91, 97, 103, 104, 108, 116, 123, 127, 139, 145, 146, 154, 162, 171, 178, and 181 and commentaries and editorials E1, E3, E9, E12, H1, H2, and H3 appear in thematic collections.

26: Phylogenetic combinatorics and its applications

- 57: Out of Africa: modern human origins
- 75: New developments in the origins and evolution of Native American populations
- 83: Birthdays of Mike Waterman and Simon Tavaré
- 91, E1: Phylogenomics and population genomics: models, algorithms, and analytical tools
- 97: Coalescent theory
- 103, 104, E3: From generation to generation: the genetics of Jewish populations
- 108: Consanguinity and genomics
- 116: Genomics and philosophy of race
- 123: The genetic anthropologist's contribution to understanding race and racial health disparities
- H1: Genetics centennial
- 127: In the light of evolution X: comparative phylogeography
- 139: Paul Joyce
- 145, 146: Algebraic methods in phylogenetics
- 154, H2: Special issue in honor of Marcus Feldman's 75th birthday
- 162, E9: Fifty years of *Theoretical Population Biology*
- H3: Race, racism, and the genetic structure of human populations
- 171: Race reconciled II: Interpreting and communicating biological variation and race in 2021
- 178, E12: Celebrating 50 years since Lewontin's apportionment of human diversity
- 181: Professor Michael Waterman's 80th birthday, part 1

Selected recognition for individual articles

Commentaries: Articles 9, 30, 93, and 114 have been featured in scientific commentaries in *Current Biology* (9), *Genetics* (93), *Nature Genetics* (9, 30), *Proceedings of the National Academy of Sciences USA* (114), and *Science* (9).

Covers: Articles 30, 42, 68, 75, 189 are connected to journal covers. Journals include Nature Genetics (cover image associated with 30), Studies in History and Philosophy of Biological and Biomedical Sciences (cover image inspired by 42), American Journal of Human Genetics (cover image inspired by 68), American Journal of Physical Anthropology (cover image associated with 75), and Genetics (cover image associated with 189).

Editorial highlights: Articles 15, 30, 38, 48, 58, 61, 67, 74, 76, 88, 93, 96, 114, 122, and 152 have been featured in editor's highlights in American Journal of Human Genetics (15, 58, 67, 96), Genetics (38, 48, 67, 74, 76, 93, 122, 152), Nature (61), Nature Reviews Genetics (30, 58, 114), Proceedings of the National Academy of Sciences USA (114), and Science (88).

Research highlight services: Articles 21, 23, 36, 42, 45, 96, 146, 158, 168, 179, and 181 have been highlighted by research highlight services. Articles have been highlighted in curated comments by Mathematical Reviews (26, 36, 146, 158, 168, 179, 181) and Faculty of 1000 (21, 23, 42, 45, 96).

Special recognition: Articles 9, 10, 40, 78, 109, 118, 147, and 159 have received notable special recognition. Article 9 was named *The Lancet* Biomedical Research Paper of the Year (*Lancet* 362: 2101-2103, 2003); article 10 was listed in the *Discover* Top 100 Science Stories of 2003 (*Discover* 25: 56, 2004); article 40 was named by *PLoS Genetics* to the top ten research articles in the first ten years of the journal (*PLoS Genetics* 11: e1005557, 2015); article 78 was selected for republication in a special issue of *Human Biology*; article 109 was named to the 2021 *PLoS Genetics* collection on Human Genetic Admixture; article 118 was named to the 2015 *Genetics Spotlight* highlighting selected articles from the journal *Genetics* that were published in 2015; article 147 received the George C. Williams Prize for an outstanding paper in *Evolution, Medicine & Public Health*; article 159 was selected as the James F. Burgess Methods Article-of-the-Year in *Health Services Research*.

Media reports: Articles 9, 10, 23, 31, 33, 40, 42, 53, 61, 67, 75, 104, 114, 118, 124, 132, 134, 137, 143, 155, 169, 170, and 177 have appeared in news stories. Venues have included Alaska Public Radio, CNN, Current World Archaeology, Discover, Genome Technology, Geotimes, National Geographic News, Nature, New Scientist, Science, Science News, Scientific American, StatNews, Vox, Wired, and the Detroit Free Press, Los Angeles Times, New York Times, Philadelphia Inquirer, San Francisco Chronicle, San Jose Mercury News, Wall Street Journal, and Washington Post. Coverage has been extensive for articles 9, 40, 42, 75, 114, 143, and 177.