

MICHAEL A. GOLDMAN, PH.D.
VITAE

Present Address:

Department of Biology
San Francisco State University
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Present Position:

Professor of Biology

Citizenship: USA

Education

Senior fellow, Medical Genetics, University of Washington, 1984-1988, Seattle, WA 98195.

Post-doctoral fellow, Medical Genetics, Baylor College of Medicine, 1982-1983, Houston, TX 77030.

Ph.D., Biological Sciences, Purdue University, 1981, W. Lafayette, IN 47907.

Bachelor of Arts in Biology, University of Rochester, May, 1976, *magna cum laude*, Phi Beta Kappa, Rochester, NY 14627.

Academic Positions

Chair, Department of Biology, San Francisco State University, 2005-2017.

Professor of Biology, San Francisco State University, September 1995-present.

Associate Professor of Biology, San Francisco State University, September 1990-September 1995.

Assistant Professor of Biology, San Francisco State University, January 1988-September 1990.

Professional Responsibilities & Committees

Ongoing Service & Awards

Distinguished Faculty Award for Excellence in Service, San Francisco State University, 2020.

Andreoli Faculty Service Award of the California State University Program in Education & Research in Biotechnology (CSUPERB), 2019-2020.

CSUPERB Leadership Award, 2019

Chair/Coordinator, Biology Graduate Program, 2019-present.

Academic Senate, 2018-present

Strategic Issues Committee, Academic Senate, 2018-present, Chair, 2020-present
Chair, Strategic Planning Committee, Department of Biology, 2018-2019
University Academic Assessment Advisory Committee, 2017-present
Evaluation Committee - Academic Institutional Research, 2017-2018
Editorial advisory board, BioQuickNews.com, 2016-present
California State University Chancellor's Doctoral Incentive Program Selection
Committee, 2015-present
Chair, Strategic Planning Council & Faculty Consensus Group, California State
University Program in Education & Research in Biotechnology, 2010-2018
Board of Advisors, Friends of the J. Paul Leonard Library, San Francisco State
University, 2012-present
Chair, College of Science & Engineering Biosafety Committee, 2015-present.
M.A. program in Human Sexuality (advisory committee member, 1998-present)
Radiation Safety Committee (acting chair, 1997-1998; chair 1999-present)
Member, Strategic Planning Council, California State University Program in
Education & Research in Biotechnology, 2005-present
Chair, Advisory Board, Center for Computing for the Life Sciences, 2005-present
Fellow, California Academy of Sciences, 2005-present
Vice President, California Omicron Chapter, Phi Beta Kappa, 2005-present
Member, Faculty Consensus Group, California State University Program in
Education & Research in Biotechnology, 2003-present
College of Science & Engineering Conservation Genetics Laboratory Steering
Committee (1992-2017, now the Genomics & Transcriptomics Analysis
Core Laboratory)
San Francisco State University Minority Enhancement Program Steering
Committee (1992-1993, 2005-present)
Phi Beta Kappa Committee on Members in Course, 2001-present
School/College of Science Safety Committee (Member, 1988-1990, Chair, 1990-
present)
Department of Biology Safety Committee (Chair, 1988-present)

Previous Service

Search Committee, Vice President for Finance & Administration, San Francisco
State University, 2021.
Search Committee, Vice President for University Advancement, San Francisco
State University, 2020.
Search Committee, Vice Provost for Academic Resources, San Francisco State
University, 2019.
Search Committee, Vice President for Students Affairs & Enrollment
Management, San Francisco State University, 2013-2014.
Program reviewer in biology for California State University campuses in Los
Angeles (2008), Fullerton (2008), Northridge (2012) & Fresno (2013).
Program Review Committee, Romberg Tiburon Center for Environmental
Studies, 2013.

Deputy Chair, Strategic Planning Council, California State University Program in Education & Research in Biotechnology, 2009-2010.
Genomics Editor, *Nature Education*, 2008-2012.
Subcommittee on Outreach, Universal Design for Learning Committee, 2008-2010.
Advisory Board member, School to Career Program, San Francisco Unified School District, 2004-2012.
Member, Committee on Content & Instruction, National Coalition for Health Professional Education in Genetics (NCHPEG), 2003-2013.
Contributing Editor, *Bio-IT World*, 2003-2012.
Council delegate, Phi Beta Kappa Society, 2003-2006.
Bioinformatics Search Committee, 2003-2005.
Coordinator, Cell, Molecular & Microbiology Programs, San Francisco State University, 1995-1999, 2002-2005.
Associate Editor, North America, *Chromosome Research*, 2002-2007.
Chair, Department of Biology Hiring, Retention, Tenure & Promotion Committee, 2002-2005.
Eden Staff Appreciation Award Advisory Committee, 2001-2005.
San Francisco State University Faculty Merit Increase Appeals Committee, 2000-2001.
Search committee chair, Developmental Biologist (1995-1996)
Biology Hiring Committee (1993-2005)
University Animal Care and Use Committee (Chair, 1993-2003)
Biology Retention, Tenure & Promotion Committee (1993-1999; 2002-2005)
Search Committee, Population Geneticist (1993-1994)
Department of Biology Teaching Evaluation Committee (1992)
Department of Biology Council (1991-2005)
California Faculty Association representative to the Public Safety Council (1989-2005)
Department of Biology Curriculum Committee (Member, 1989; Chair, 1989-1994)
Department of Biology Scholarship Committee (1988-1992, 1999-2002)

Academic Publications
(*Papers, Articles, Reviews, Book Reviews*)

- M. A. Goldman. 2021. Probing the genetic future of humanity. *Science* 371: 789.
<https://science.sciencemag.org/content/sci/371/6531/789.full.pdf>
- M. A. Goldman. 2020. Evolution gets personal. *Science* 367: 1432.
<http://science.sciencemag.org/content/367/6485/1432>
- M. A. Goldman. 2018. Me and you and everyone we know: From the Big Bang to our early ancestors, a philosopher probes human origins and identity. *Science* 361: 1320.
<http://science.sciencemag.org/content/361/6409/1320.1>

- M.T. Owens, et al. 2018. Collectively Improving Our Teaching: Attempting Biology Department-wide Professional Development in Scientific Teaching. *CBE: Life Sciences Education* 17(1):ar2, 1-17.
<http://www.lifescied.org/content/17/1/ar2.full>
- M. A. Goldman. 2018. Our idiosyncrasies. *Science* 359: 169.
 10.1126/science.aar2401
- D. A. Marshall, et al. 2017. The price of whole genome sequencing may be decreasing, but who will be sequenced? *Personalized Medicine* 14: 203-211.
 doi:10.2217/pme-2016-0075.
- M. A. Goldman 2016. Form. Function. Fate. *Science* 352: 1403.
<http://scim.ag/1UeXVPI>
- M. A. Goldman. 2015. Digitizing the biosphere. *Science* 348: 979.
- M. A. Goldman. 2014. The edge of science. *Science* 346: 173-174.
- M. A. Goldman. 2014. Biogeek catastrophe. *Science* 343: 139.
- M. A. Goldman. 2013. Origins of the modern Prometheus. *Science* 341: 131.
- M. A. Goldman. 2012. Worries of a genomic futurist. *Science* 338: 470-471.
- M. A. Goldman. 2012. Perceived inheritance. *Science* 336: 297-298.
- M. A. Goldman. 2011. Seed of revolution. *Nature* 480: 317.
- M. A. Goldman. 2011. Science & the Law: Genes in Police Files. *Science* 332: 308.
- M. A. Goldman. 2011. A means for ought from is? *Science* 331: 286.
- M. A. Goldman. 2010. Building life from the bottom up. *Nature* 464: 1129-1130.
- M. A. Goldman. 2010. We should all have a little list. *Science* 328: 1357.
- M. A. Goldman. 2010. The 6 billion genomes project. *Personalized Medicine* 7: 219-221.
- M. A. Goldman. 2010. Building life from the bottom up. *Nature* 464: 1129-1130.
- M. A. Goldman. 2009. Epigenetic determinism. *Science* 325: 816.
- M. A. Goldman. 2009. A limited view of the future. *Nature* 459: 511-512.
- M. A. Goldman. 2008. On ends and means. *Science* 319: 1486.
- M. A. Goldman. 2007. Calamity gene: When biotechnology spins out of control. *Nature* 445: 819-820.
- M. A. Goldman. 2007. Cipher sleuth. *Nature Genetics* 39: 139.
- M. A. Goldman. 2006. Biotechnology and the human soul. *Science* 314: 423.
- M. A. Goldman. 2006. Biotechnology and humanity. *Nature Medicine* 12: 989 - 989
- M. A. Goldman. 2006. Faster, better, healthier. *Nature* 441: 1049 - 1050.
- M. A. Goldman. 2006. Evolution's secret, a review of "The Darwin conspiracy."
Nature Genetics 38: 7.
- M. A. Goldman. 2005. Digital drug discovery. *Genome Biology* 6: 348-350.
- M. A. Goldman. 2005. Genomic meanings, a review of "Molecular models of life: Philosophical papers on molecular biology." *Science* 310: 1121-1122.
- M. A. Goldman. 2004. Ring theory, a review of "The science of Middle-Earth."
Nature 432: 674-675.
- M. A. Goldman. 2004. Kindred spirits, a review of "The God gene." *Nature Genetics* 36: 1241.
- M. A. Goldman. 2004. RNAi in research and therapy. *Genome Biology* 5: 342-344.

- M. A. Goldman. 2004. Hip Hop to the Genome. *Bio-ITWorld*, 17 June.
- M. A. Goldman. 2004. Promises and perils of technology's future. *Science* 303: 629-630.
- M. A. Goldman. 2003. Living with the Neandertals, a review of *Darwin's Children*, by G. Bear. *Nature* 424: 726 - 727.
- M. A. Goldman. 2003. It's time to take medicine digital. *Bio-ITWorld*, June 15. Also appeared in Health-IT World online.
- M. A. Goldman. 2003. The challenge of molecular medicine. *Bio-IT World*, May 9.
- M. A. Goldman. 2003. The epigenetics of the cell. *Genome Biology* 4: 309-310.
- M. A. Goldman. 2003. The ends and cancer. *Drug Discovery Today* 8: 294-296.
- M. A. Goldman. 2002. A virtual pharmacopeia. *Bio-IT World*, November 12. <http://www.bio-itworld.com/archive/111202/virtual.html>
- M. A. Goldman. 2002. Cancer: The chromatin connection. *Trends in Genetics* 18: 390-391.
- M. A. Goldman. 2002. The ABC's of genomics. *Nature Genetics* 30: 357.
- M. A. Goldman. 2001. Spandrels or selection? *Nature* 413: 252-253.
- M. A. Goldman. 2001. Genomics: An Industry Perspective. *Science* 292: 1491-1492.
- S. M. Gartler & M. A. Goldman. 2001. The biology of the X chromosome 2000. *Current Opinion in Pediatrics* 13: 340-345.
- M. A. Goldman. 2001. CpG islands. *Encyclopedia of Genetics*, Academic Press.
- M. A. Goldman. 2001. Housekeeping genes. *Encyclopedia of Genetics*, Academic Press.
- M. A. Goldman. 2001. Cloning reality into fiction. *Nature Genetics* 27: 15.
- M. A. Goldman. 2000. Evolution rising from the grave. *Nature* 404: 15-16.
- S. M. Gartler & M. A. Goldman. 2000. X-chromosome inactivation. *Encyclopedia of the Life Sciences*. Macmillan Publishing, Ltd. <http://www.macmillan-reference.co.uk/science/EncyclopediaLifeSci.htm>
- S. C. Spusta & M. A. Goldman. 1998. Xistential Wanderings: The role of Xist RNA in X-chromosome inactivation. *Current Science* 77: 530-538.
- M. A. Goldman. 1998. Human Cloning: Science Fact & Fiction. *Southern California Interdisciplinary Law Journal* 8: 103-116.
- M. A. Goldman, P. S. Reeves, C. M. Wirth, W. J. Zupko, M. A. Wong, S. Edelhoff & C. M. Disteché. 1998. Comparative methylation analysis of murine transgenes that undergo or escape X-chromosome inactivation. *Chromosome Research* 6: 397-404.
- M. A. Goldman. 1997. Executive decision: Chromatin structure and gene regulation. *Trends in Genetics* 13: 387-388.
- M. A. Goldman. 1996. Beyond the pale. *Current Biology* 6: 1355.
- Gartler, S.M., & M.A. Goldman. 1994. Reactivation of inactive X-linked genes. *Developmental Genetics* 15: 504-514.
- M. A. Goldman. 1992. The silence of the X. *Nature Genetics* 2: 169-170.
- S. D. Colman, J. K. Mellott, A. S. Almeida, M. A. Goldman, P. van Tuinen & T. P. Yang. 1992. Isolation and characterization of radiation-reduced hybrids containing portions of the proximal long arm of the human X

- chromosome: Identification of hybrids containing the Menkes' disease locus. *Somatic Cell & Molecular Genetics* 18: 201-213.
- S. M. Gartler, K. A. Dyer & M. A. Goldman. 1992. Mammalian X-chromosome Inactivation. *Molecular Genetic Medicine*, Academic Press, v. 2, pp. 121-160.
- D. E. Riley, M. A. Goldman & S. M. Gartler. 1991. Nucleotide sequence of the 3' nuclease sensitive region of the human phosphoglycerate kinase gene. *Genomics* 11: 212-214.
- M. A. Goldman. 1988. The chromatin domain as a unit of gene regulation. *BioEssays* 9: 50-55.
- M. A. Goldman, K. R. Stokes, R. L. Idzerda, G. S. McKnight, R. L. Brinster and S. M. Gartler. 1987. A chicken transferrin gene on the X chromosome of transgenic mice escapes X-chromosome inactivation. *Science* 236: 593-595.
- M. A. Goldman, S. M. Gartler, E. A. Keitges, and D. E. Riley. 1986. The utilization of the human phosphoglycerate kinase gene in the investigation of X-chromosome inactivation. *Horizons in Biochemistry and Biophysics: Human Genes and Diseases*, ed. F. Blasi. John Wiley & Sons.
- D. E. Riley, M. A. Goldman and S. M. Gartler. 1986. Chromatin structure of active and inactive human X-linked phosphoglycerate kinase genes. *Somatic Cell and Molecular Genetics* 12: 73-80.
- M. A. Goldman, G. P. Holmquist, M. C. Gray, L. A. Caston and A. Nag. 1984. Replication timing of mammalian genes and middle repetitive sequences. *Science* 224: 686-692.
- M. A. Goldman, P. T. LoVerde, C. L. Chrisman and D. A. Franklin. 1984. Chromosomal evolution in planorbid snails of the genera *Bulinus* and *Biomphalaria*. *Malacologia, International Journal of Malacology* 25: 427-446.
- M. A. Goldman, P. T. LoVerde, C. L. Chrisman, D. A. Franklin, F. Matthews, R. J. Pitchford, and C. S. Richards. 1983. Nucleolar organizer regions in *Biomphalaria* and *Bulinus* snails. *Experientia* 39: 911-913.
- M. A. Goldman, P. T. LoVerde, and C. L. Chrisman. 1983. Hybrid origin of polyploidy in freshwater snails of the genus *Bulinus*. *Evolution* 37: 592-600.
- M. A. Goldman, P. T. LoVerde, and C. L. Chrisman. 1980. Comparative karyology of the freshwater snails *Bulinus tropicus* and *B. natalensis*. *Canadian Journal of Genetics and Cytology* 22: 361-367.

Research & Education Funding (PI or Co-PI)

- 2010-2013: NSF Science Master's Program in Biotechnology & Stem Cell Biology.
2010-2014.
- 1998-2002: NIH Minority Biomedical Research SCORE Grant, "Mapping of chromatin border elements in the mammalian genome." Funded 7/15/98. \$957,891 over 4 years.
- 1995-1998: NIH Minority Biomedical Research Support (MBRS) grant, "The chromatin domain as a unit of X-chromosome inactivation and imprinting," September 1995-December 1998, \$229,000.
- 1995-1998: NIH grant, "Supplemental for minority undergraduate education," June 1995-present, \$22,000.
- 1995-1998: NIH grant, "Analysis of chromatin domains in X-chromosome inactivation and imprinting," June 1995-present. \$106,000.
- 1991-1994: National Institutes of Health (NIH) grant, "X-chromosome inactivation and imprinting in transgenic mice." June, 1991-May 1994. \$113,000.
- 1989-1992: Research Corporation/Bristol Myers Company grant to fund research, "The mechanism of X-chromosome inactivation," June 1989-1992, \$21,000.

Professional Meeting Organizing

Personalized Medicine, annually at San Francisco State University, 2008-present.

Asilomar Chromatin, Chromosomes & Epigenetics Conference, a.k.a. International West Coast Chromatin and Chromosomes Meeting, or Asilomar Chromatin and Chromosomes Conference, annually at Asilomar, Pacific Grove, California, 1998-present.

Professional Refereeing

Professional Journal Refereeing: Science, Human Genetics, Proceedings of the National Academy of Sciences, Nucleic Acids Research, Nature Genetics, Cytogenetics and Cell Genetics, Canadian Journal of Zoology, PLoS One, PLoS Computational Biology, Molecular and Cellular Biology, and American Journal of Human Genetics.

Editorial Advisory Board: BioQuick News, 2016-present. Bioquicknews.com

Textbook reviewing: University Science Books, Academic Press, W. B. Saunders, W. H. Freeman, Garland Publishing, Wm. C. Brown Publishers, Stockton Press, Addison-Wesley-Longman, McGraw-Hill Higher Education, Wiley Interscience, and Jones & Bartlett.

Editorial advisory board: For *Encyclopedia of the Life Sciences*, Stockton Press, 1997-present. Responsibility for outlining and assigning articles in human genetics.

Reviewer: For *Encyclopedia of the Human Genome*, Nature/Macmillan Publishing, London, 2001-2010.

Reviewer: For *Encyclopedia of Genetics*, Harcourt Publishing, New York, 2001-2005.

Associate Editor: Responsible for North American submissions in animal and human systems, *Chromosome Research* (Springer), 2002-2010.

Referee, Public Broadcasting System program on human cloning, KCTS, Seattle, WA, 2002.

Contributing Editor: *Bio-IT World*, IDG Press & Cambridge Healthtech Institute, Lexington, MA, 2003-2010.

Professional Grant Reviewing

National Institutes of Health: Academic Research Enhancement Award, Science Education Partnership Awards, Minority Biomedical Research Support Grant, National Center for Minority & Health Disparities - Loan Repayment Program.

National Science Foundation: GK-12 Fellowship Program.

CancerCare, Manitoba, Canada: grants program.

California State University Program in Education & Research in Biotechnology. Research, curriculum development and fellowship programs.

University Teaching Experience

- Honors Genetics. San Francisco State University. 2017-present. *Capstone seminar course for undergraduate Cell & Molecular Biology majors other biology students.*
- Human Genetics. San Francisco State University, Fall, 2008-2009. *Core graduate course for MS Program in Genetic Counseling, elective in Cell & Molecular Biology Graduate Program.*
- Developmental Biology. San Francisco State University. Spring, 1988-2001. *Capstone course for undergraduate Cell & Molecular Biology majors and graduate students.*
- Laboratory in Genetic Engineering. San Francisco State University, Spring, 1988 & 1989. *Intensive laboratory experience in recombinant DNA technology for students in graduate certificate program.*
- Special Projects in Genetic Engineering. San Francisco State University, Fall, 1988, 1989 & 1990.
- Seminar: Molecular Biology of Development. San Francisco State University, Fall, 1988 and 1991.
- Genetics. San Francisco State University, Fall 1989-2004. *General genetics for Biology and Biochemistry majors, and for pre-medical students.*
- Human Biology Laboratory for non-science majors. San Francisco State University, Fall 1990.
- Colloquium in Microbiology, Cell and Molecular Biology, San Francisco State University, every semester, 1995-1999, 2003.
- Ethical Issues in Science and Technology, San Francisco State University, Spring 1999-2004. *Emphasizes bioethics, including gene testing, gene therapy, and the use of human and animal subjects in research, for a general University audience.*
- Topics in computing for the life sciences, San Francisco State University, Spring 2004. *Co-taught with Computer Science faculty for graduate students in Computer Science.*
- Pharmacogenomics. San Francisco State University, Spring 2004, Fall 2017-2019.

Public Education

- Science, Technology, Engineering & Mathematics (STEM) Careers & Majors, for Health & Social Science 110: Critical Thinking/Student Success in Health & Social Sciences Fields, 18 April 2018, S F State University.
- Education & Research in an Era of Genomic Medicine, Colloquium for the Department of Chemistry, California State University, Long Beach, 5 October 2016.

Critical Care Nursing for the Third Millennium: Genomics & Personalized Medicine, for the School of Nursing, San Francisco State University, 17 September 2016.

Essay contest judge: First-level DNA Day Essay Contest, American Society of Human Genetics, 2013-present.

Foundations of Genomic & Personalized Medicine, BioMarin Pharmaceutical Inc, San Rafael, CA, 13 April 2016.

Foundations of genomic & personalized medicine, Wuhan Polytechnic Institute, *and* South-Central University for Nationalities, Wuhan, China, 2015.

Epigenetics and Epigenomics, Fromm Institute, University of San Francisco, CA, 2014.

The ethics of science and the science of ethics, Fromm Institute, University of San Francisco, CA, 2012.

Key technologies in personalized medicine, Personalized Medicine World Conference 2012, Mountain View, CA, 2012.

Essential background to personalized medicine, Personalized Medicine World Conference 2011, Mountain View, CA, 2011.

A primer of personalized medicine, Fromm Institute, University of San Francisco, CA, 2011.

Fundamentals of personalized medicine, Personalized Medicine World Conference, Tel Aviv, Israel, 2010.

Nature v. Nurture: One biologist's perspective. Department of Integrative Biology, University of California, Berkeley, 2010.

Genomics and personalized medicine, Personalized Medicine World Conference 2010, Mountain View, CA, 2010.

Medicine in the Genome Age, Seton Medical Center, Daly City, CA, November 2007.

Cloning and stem cells. Classroom speaker at Gunn High School, Palo Alto, CA, 10 March 2004.

Role of scientists in bioethics. Panel discussion with Elizabeth H. Blackburn. Practice of Science Symposium, Post-doctoral Fellows Association, University of California, San Francisco, March 2004.

Homer Simpson & the Clone Myth. City College of San Francisco, September 2003.

Human cloning: Science fact or fiction. San Francisco State University NEXA: Science-Humanities Convergence Symposium, 11 November 2002.

Genetics of multiple sclerosis. The Boston Home, Dorchester, MA, 11 February 2002.

Genophobia in the age of genomic medicine. Celera Diagnostics, Inc., Alameda, CA, January 2002.

Featured speaker: ALIVE AGAIN: The human cloning debate. Bay Area Science Symposium, Foothill College, Los Gatos, CA, May 2001.

Featured speaker: Controversy in the genome era. Modesto Area Partners in Science, Modesto, CA, March 2001.

Classroom speaker: Gunn High School, 14 February 2001.

Lecturer: The stem cell controversy, Gunn High School program in Biotechnology Theory and Practice, Palo Alto, CA, November 2000.

Featured speaker: Medico-Dental Guild of California, San Francisco, "Beyond the sequence: The new human epigenome," May 2000.

Featured speaker: Human cloning: The tooth of the matter. Medico-Dental Study Guild of California, University of the Pacific School of Dentistry, San Francisco, May 1999.

Presenter: Stanford Human Genome Education Program - Palo Alto Unified School District summer program, Palo Alto High School, July 1997.

Instructor: Biotechnology. For the teachers of San Francisco Unified School District, two weeks, June 1997, at San Francisco State University.

Lead Instructor: Molecular Biology for the Inexperienced. Funded by the National Science Foundation Undergraduate Faculty Enhancement Program, two weeks, July 1996, at San Francisco State University.

Presenter: Stanford Human Genome Education Program - Palo Alto Unified School District summer program, Palo Alto High School, July 1996.

Instructor: Biotechnology. For the teachers of San Francisco Unified School District, two weeks, June 1996, at San Francisco State University.

Presenter: UCSF Graduate Student Career & Research Day, concerning careers at comprehensive universities, Univ. of California, San Francisco, April 1996.

Presenter: For whom does *The Bell Curve*? San Francisco State University interdisciplinary faculty critique of the best-selling book. April 1995.

Lecturer: Santa Clara County Biotechnology Education Program summer workshop for high school teachers, 1995.

Lecturer: Gunn High School (Palo Alto) in 1993, 1994, and 1995, talking to and with students in three to four classes each year.

Instructor: Molecular Biology Short Course, Beckman Instruments, Inc. Seven 4-day courses between August 1992 and August 1994.

Instructor: NSF Chautauqua Short Course on Molecular Techniques in Systematic and Evolutionary Biology. San Francisco State University, Spring 1992, Spring and Summer 1993.

Consultant: "Winding Your Way Through DNA Curriculum Development Project." 1993-present. Producing three videotapes for high school and middle school, concerning careers in science, history of science, and the nature of genetic disease.

Instructor: Genome Education for Elder Americans, Elderhostel, San Francisco State University, October 1993.

Consultant: Exploratorium concerning the assembly of a display on molecular biology. 1993.

Judge: High School Science Symposium sponsored by the Lawrence Hall of Science, in 1989, 1992 and 1993.

Speaker: UCSF Mini-Course on the Practice of Science in a session entitled "Career options outside of a research-oriented university" in June 1992. I

described my role at SFSU to graduate students and post-doctoral fellows who might be considering career options at this time.

Lecturer: Biology classes at Aragon High School (San Mateo) on three occasions in 1990-1992.

Instructor: Four two-hour lectures on Eukaryotic Molecular Biology to laboratory technicians and scientists for the State of California, Department of Health Services, at Berkeley, 1989.

Public Education Articles

Op-Ed, "Bush's moralism on stem cell research is misguided." Pacific News Service, online 17 September 2004 (pacificnews.org).

Op-Ed, "Real science, symbolic law." San Francisco Chronicle, 7 October 2002, page A21.

Discrimination: Beleaguered: Efforts at banning genetic discrimination. Gene Letter 2(16). www.geneletter.com, May 2001.

Essay published in *Insight* (Washington, DC), "If human cloning becomes a reality, should it be a legal option?" 25 September 2000, pages 41 and 43.

Forum article in the *Sacramento Bee*, 19 September 1999, page I-1, entitled "Human cloning is a disaster in the making: A scientist's case."

Op-Ed column in the *San Francisco Chronicle*, 10 May 1999, page A21, on human embryonic stem cell technology, entitled "Open, don't restrict, embryonic stem cell research."

Article: Human Cloning: Science Fact & Fiction. *Southern California Interdisciplinary Law Journal* 8: 103-116.

Op-Ed column in the *Los Angeles Times*, 8 January 1998, on human cloning, entitled "Not just a reproductive choice." Reprinted in *Minneapolis Star Tribune*, 13 January 1998, and *Sacramento Bee*, 26 January 1998.

Essay in *Current Biology* 6: 1355 (1996). Beyond the Pale.