Scott Freeman

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EDUCATION

University of Washington, Seattle WA, Ph.D., 1990, Zoology
Dissertation: Molecular systematics and morphological evolution of the blackbirds
Carleton College, Northfield MN, B.A., 1978, Biology

PROFESSIONAL

Department of Biology, University of Washington, Seattle, WA
Lecturer, Part-time, 1999-2011; Senior Lecturer Part-time 2011-2012; Senior Lecturer Full-time 2012-2013; Principal Lecturer 2013-present, HHMI STEM-Dawgs Program Director 2014-present. Courses taught: Introductory Biology, Evolutionary Biology, and Tree of Life for undergraduate majors; Summer Bridge Biology and Biology boot camp for at-risk students; seminar in undergraduate teaching for graduate students; over 14,000 students total. Independent studies, ad hoc honors projects, and undergraduate research supervision: 35 students.

Pearson PLC (Prentice Hall; Benjamin Cummings)
Author, 1995-2010. Co-authored leading evolutionary biology textbook for undergraduate majors; sole-author of #2 introductory biology textbook for undergraduate majors. The texts have been translated into Turkish, Spanish, Portuguese, and Korean and have sold over 440,000 copies.

Satsuma Software, Inc., Seattle, WA
Founder and President, 1994-1996. Lead for a software company developing science games for 10-17 year-olds in the home education market.

The Burke Museum, University of Washington
Director of Public Programs, 1992-1996. Project coordinator for $4.1M renovation of natural science and cultural exhibits, managing eight paid staff and 70 volunteers.

Princeton University, Princeton, New Jersey
Post-doctoral fellow, Department of Ecology & Evolutionary Biology, 1990-1992. Conducted research with Dr. Martin Kreitman on molecular evolution.

International Crane Foundation, Baraboo, Wisconsin
Education Coordinator, 1980-1984. Directed education and exhibit programs on endangered species. Managed two paid staff and over 20 volunteers.

Aldo Leopold Memorial Reserve, Baraboo, Wisconsin
Education fellow, 1980. Originated and directed seminar series on ecological restoration of private lands.

Interagency Grizzly Bear Study, Yellowstone Park
Research Assistant, 1978.

GRANTS AND CONTRACTS

- Vulcan, Inc. Service Contract for research on electrical signaling educational software; approved November 2015; $164,000.
- University of Washington College of Arts and Sciences, Office of the Dean: *Center for the Advancement of Undergraduate Science Education (CAUSE);* 5 years, $250,000, renewable; awarded September 2015.
- BEACON (NSF consortium) Genotype-phenotype-fitness assays for an introductory biology CURE; awarded May 2015; $110,000
- Howard Hughes Medical Institute, Program Director: *The HHMI STEM-Dawgs Program*; 5 years, $1,500,000; awarded May 2014.
- NSF-TUES II, co-PI: Collaborative research: *Navigating from Vision to Change with Bio-MAPS*; 3 years, $240,021; awarded August 2013.
- National Science Foundation TUES I, co-PI: $50,000, *Can Highly Structured Course Designs Reduce the Achievement Gap in Introductory Biology?* Supplement awarded November 2012.
- National Science Foundation TUES I, co-PI: $250,000, *Can Highly Structured Course Designs Reduce the Achievement Gap in Introductory Biology?* awarded October 2011.
- NSF Course, Curriculum, and Laboratory Improvement, co-PI: $200,000, *GATEWAY Learning in Biology*, awarded February 2010.
- UW Office of the Provost, Innovations in Gateway Courses Initiative, PI: $60,000; *Innovations in Biology 180*; awarded February 2005.

HONORS

- 2016: Two years after publication, the abstract from Freeman et al. 2014 (*PNAS*) has been downloaded over 150,000 times; Web of Science lists it as a "Hot Paper" and "Most Highly Cited Paper;" its Altmetrics score of 1470 puts it in the 99th percentile of tracked articles of a similar age in all journals
- 2015: *ScienceInsider* article on Freeman et al. 2014 (*PNAS*) is #3 in *Science* magazine's most-read Top 10, "Best of 2014"
- 2013: UW Panhellenic Association and Interfraternal Council, Outstanding Faculty Award
- 2012: "Increased course structure" (2011) paper selected for CBE-LSE "Highlights" volume
- 2011: "Prescribed active learning" (2007) is the most highly cited CBE-LSE paper since the journal's inception in 2002
- 2010: "How accurate is peer grading?" paper selected for CBE-LSE "Highlights" reprint volume
- 2010: Distinguished Teaching Award, University of Washington
- 2007: "Prescribed active learning" paper selected for CBE-LSE "Highlights" reprint volume
- 2004: *Biological Science* 2nd edition selected as Prentice Hall "Book of the Year"
- 2001: *Biological Science* 1st edition selected as Prentice Hall "Book of the Year"
- 1991: Alfred P. Sloan Post-doctoral Fellowship in Molecular Evolution
- 1978: B.A. awarded Magna Cum Laude
- 1978: Phi Beta Kappa

RECENT INVITED TALKS

2016

- Howard Hughes Medical Institute, Education Program Staff, October
- Gates Foundation, Annual Retreat for Post-Secondary Success Program, July
- Earth Educators Rendevous, Plenary, July
- Association of Pacific Rim Universities, Provost's Meeting, Workshop on research in teaching; March

(Declined 9 invitations)

2015

- UW Office of Minority Affairs and Diversity, Professional Development Day, December
- UW Large Class Colloquium, August
- University of California, San Diego, Seminar, Department of Biological Sciences, June
- NIH IRACDA National Meeting, Plenary and Teaching Workshop, June
- Ohio-PKAL Annual Meeting (AAC&U), Plenary and conference closing, May
- Otterbein University (Ohio), STEM Faculty development workshop (WIDER grant), May
- UW School of Medicine Faculty Development Workshop, May
- UW Life Sciences Complex Advisory Board, May
- National Science Foundation, DUE and BIO Divisions, April
- University of Minnesota, Departmental Seminar, March
- University of Washington. Active Day of Learning; two workshops, February
- GMMB Higher Education Network, January

(Declined 26 invitations)

2014

UW School of Dentistry, Departmental Seminar; Gates Foundation, Personalized Learning Network meeting, Plenary; Society for the Advancement of Chicanos and Native Americans in Science (SACNAS), Annual Meeting, Biology Education Symposium; Arizona State University School of Life Sciences, Seminar; Scientific American Executive STEM Summit on the Science of Learning; Society for the Advancement of Biology Education Research (SABER) Annual Meeting Plenary; UW Dream Project Spring BBQ; University of Alabama Teaching Advancement Program; University of Washington, Scholarship of Teaching and Learning Symposium, Plenary; Society for Developmental Biology, Northwest Regional Meeting; March

(Declined 25 invitations)

2013: University of Washington, Department of Biology, Annual Retreat Faculty talk, September; Washington State University, Department of Molecular Biosciences, September; University of Minnesota, College of Biological Sciences, Seminar, September; UNC-Chapel Hill, Department of Biology, Seminar, September; American Society of Biochemistry and Molecular Biology Special Symposium, Plenary, August; Society for the Advancement of Biology Education Research, Poster, July; University of Washington, MEChA de UW Adelante Con Educación

workshop, May; University of Washington, Dream Project event, May; University of Washington, Scholarship of Teaching and Learning Symposium (poster), April; University of Washington, School of Public Health, February; University of Washington Future Faculty Fellows symposium, January

(Declined 10 invitations)

2012: University of Washington "Research Exposed" seminar; Madigan Air Force Hospital, Faculty Development Seminar; Indiana University, Symposium on Scholarship of Teaching and Learning, Plenary, Department of Biology departmental seminar; University of Washington Biology Department Seminar (promotion talk); SACNAS (Society for the Advancement of Hispanics/Chicanos & Native Americans in Science) Annual Meeting, Plenary; University of Colorado, Boulder, Departmental Seminar; University of Maine, Departmental Seminar; MIT, Departmental seminar; Introductory Biology Project, Conference at AAAS, Washington DC; NIH IRACDA (Post-doctoral fellows) Annual Symposium, University of Pennsylvania; Plenary Address and two workshops at the 1st Annual Regional Faculty Development Retreat in the UW School of Medicine; NWBio Annual Meeting, Plenary; UW College of A&S Lab Crawl

2011: University of Washington, School of Social Work, Seminar; UW Biology First year grad student seminar, Teaching session; North Dakota State University, Biology Departmental Seminar; Southern Illinois University, Biology Departmental Seminar; University of Tennessee, Active Learning Workshop and Biology Departmental Seminar; Tancho Protection Group and Kinashibetsu Wetland Trust, Kushiro, Japan; University of Washington Future Faculty Fellows Workshop; Keynote; SABER annual meeting: concluding plenary; Biology Director's Consortium, Annual Meeting; University of Washington, Parent Orientation Seminar (two); University of Washington Graduation Weekend Colloquium ; University of Washington Archaeology Graduate Student Seminar; University of Washington Pre-health Seminar; American Society of Physiologists annual meeting, Education Research Symposium; Eastern Washington University, Biology Dept. Roundtable and Darwin Day Public lecture; Kushiro Museum & Kinashibetsu Wetland Trust, Japan, Public lectures; Society for Integrative and Comparative Biology, Annual Meeting, Henry Moore Lecture

2010: University of Washington Faculty Fellows (Diversity session); University of Washington HHMI Future Faculty Fellows Symposium (Keynote); University of Washington Teaching Showcase; also Biology Departmental seminars at the University of Washington, Eastern Carolina University, Armstrong Atlantic State University, North Carolina State University, University of North Florida

2009: University of Washington, HHMI Future Faculty Fellows Symposium (Keynote); University of Washington Program on the Environment Meet-Greet-Teach Workshop; Lone Star College, Houston TX, Teaching Phylogenetics Symposium; Montana State University, HHMI Northwest Net

2008: Departmental seminars (unless noted): SUNY-Albany, Boston College, University of Maryland, Emory University, Georgia Perimeter College, University of Arizona, University of Toronto-Scarborough, University of Toronto Ohio University, University of Michigan, Eastern Michigan University, James Madison University, College of William and Mary, North Carolina State University, University of South Florida, University of Wyoming, Biology Leadership Conference (poster); Houston Area Teaching Workshop (keynote), Middle Tennessee State University, Western Kentucky University, University of Kentucky, College of Staten Island, Eastern Connecticut University, University of Massachusetts—Amherst; University of Wisconsin-Madison, Regional Teaching Workshop; University of Washington, HHMI Future Faculty Fellows Symposium (Keynote)

2007: Dearborn Community College, Active Learning Workshop (Keynote); University of Illinois, Chicago, Active Learning Workshop (Keynote); University of Washington, HHMI Future Faculty Fellows Symposium (Keynote); University of British Columbia, BC Bio Forum, Panel Participant; Alberta Introductory Biology Association (Keynote); University of Washington, Scholarship of Teaching and Learning Symposium (Keynote); University of North Florida (Brown Bag Seminar)

2006: Departmental seminars (unless noted): Loyola University (Biology); UI-Champaign/Urbana (EEB/MCB); University of Washington (Biology); Portland State University (Biology); Washington State University (Biological Sciences); University of Washington, HHMI Future Faculty Fellows Symposium (Keynote); University of Georgia (Genetics); International Society Scholarship of Teaching and Learning, Washington DC, Poster; University of British Columbia, BC Bio (Keynote)

SERVICE

- PhD Supervisory Committee member: Benjamin Wiggins, UW School of Education (Graduate School Representative); Roddy Theobald, UW Department of Statistics (Graduate School Representative); Hannah Jordt, UW Department of Biology; Gideon Dunster, UW Department of Biology
- UW President's Advisory Committee on Intercollegiate Athletics, 2016-present
- UW Provost's Committee on the Status of Lecturers: 2012-2014
- Faculty advisor, UW SACNAS Chapter; 2015-present
- Founding member, Society for the Advancement of Biology Education Research, 2010
- "Core Member" Biology Director's Consortium, 2010-present
- NSF Vision and Change Initiative, Regional and National Meeting invitee, 2008-2009
- Founding member, UW Biology Education Research Group, 2009
- UW Biology Undergraduate Program Committee, 2008-present

Manuscript/proposal review for *Science*, *Proceedings of the National Academy of Sciences, PLoS ONE, CBE-Life Sciences Education*, *Advances in Physiology Education*, *Council on Undergraduate Research Quarterly,* Roberts & Co. Publishers, Pearson Publishing, UW Royalty Research Fund, UW Huckabay Fellowship Program, National Science Foundation. 2007-present

BIBLIOGRAPHY: SCIENTIFIC PUBLICATIONS

*Freeman, S., R. Theobald, A.J. Crowe, M.P. Wenderoth. Likes attract: homophily in a college biology classroom. *Active Learning in Higher Education*, scheduled for publication in July 2017.

*Freeman, S, N. Okoroafor, C.M. Gast, M. Koval, F.C. Fang, E. O'Connor, R.D. Harrington, J.W. Parks. 2016. Crowdsourced data indicate widespread multidrug resistance in skin flora of healthy young adults. *Journal of Microbiology and Biology Education* 17: 172-182, doi http://dx.doi.org/10.1128./jmbe.v17il.1008.

Jenkins, E.T., A. Crowe, J. HilleRisLambers, M.P. Wenderoth, and S. Freeman*. 2015. Women learn more from local than global examples of the biological impacts of climate change. *Frontiers in Ecology and the Environment* 13(3): 132-137, doi: 10.12890/140261.

Brownell, S.E., S. Freeman*, M.P. Wenderoth, and A.J. Crowe. 2014. BioCore guide: A tool for interpreting the core concepts of Vision and Change for biology majors. *CBE-Life Sci. Educ.* 13: 1-12.

*Freeman, S, S.L. Eddy, H. Jordt, M.K. Smith, M.P. Wenderoth. 2014. Reply to Hora: Meta-analytic techniques are designed to accommodate variation in implementation. *PNAS* 10.1073/pnas/1410405111.

*Freeman, S, S.L. Eddy, M. McDonough, M.K. Smith, N. Okoroafor, H. Jordt, M.P. Wenderoth. 2014. Active learning improves student performance in science, engineering, and mathematics. *PNAS* 111(23): 8420-8415.

Theobald, R. and S. Freeman*. 2014. Is it the intervention or the students? Using regression to control for student characteristics in undergraduate STEM education research. *CBE-LSE* 13: 41-48.

Brownell, S.E., M.P. Wenderoth, R. Theobald, N. Okoroafor, M. Koval, S. Freeman*, C.L. Walcher-Chevillet, and A.J. Crowe. 2013. How students think about experimental design: novel conceptions revealed by in-class activities. *Bioscience* 64(2): 125-137.

Eddy, S.L., A. J. Crowe, M.P. Wenderoth, and S. Freeman*. 2013. How should we teach tree thinking? An experimental test of two hypotheses. *Evolution: Education and Outreach*, 6:13.

Haak, D., J. HilleRisLambers, E. Pitre, and S. Freeman. 2011. Increased structure and active learning reduce the achievement gap in introductory biology. *Science* 332: 1213-1216.

Freeman, S., D. Haak, and M.P. Wenderoth. 2011. Increased course structure improves performance in introductory Biology. *CBE—Life Sciences Education* 10: 175-186.

Freeman, S. and J.W. Parks. 2010. How accurate is peer grading? *CBE—Life Sciences Education* 9: 482-488.

Freeman, S. et al. 2014. Biological Science, 5th ed (Benjamin Cummings: San Francisco).
Freeman, S. 2011. Biological Science, 4th ed (Benjamin Cummings: San Francisco).
Freeman, S. 2008. Biological Science, 3rd ed (Benjamin Cummings: San Francisco).
Freeman, S. 2005. Biological Science, 2nd ed (Prentice Hall: Upper Saddle River, NJ)
Freeman, S. 2002. Biological Science (Prentice Hall, Upper Saddle River, NJ)

Freeman, S. and J.W. Parks. 2010. How accurate is peer grading? *CBE—Life Sciences Education* 9: 482-488.

Guo, S., S. Freeman, J. Lawhorn, and A. Zheng. 2008. Science education: Should facts come first? *Science* 320: 1012.
Zheng, A.Y., J.K. Lawhorn, T. Lumley, and S. Freeman. 2008. Application of Bloom's taxonomy debunks the "MCAT myth." *Science* 319: 414-415.

Freeman, S., E. O'Connor, J.W. Parks, M. Cunningham, D. Hurley, D. Haak, C. Dirks, and M.P. Wenderoth. 2007. Prescribed active learning increases performance in introductory biology. *CBE—Life Sciences Education* 6: 132-139.

Herron, J.C. and S. Freeman. 2014. Evolutionary Analysis, 5th ed (Benjamin Cummings: San Francisco).
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Freeman, S. and J.C. Herron. 2003. Evolutionary Analysis, 3rd ed (Prentice Hall: Upper Saddle River, NJ)
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Bermingham, E., S. Rohwer, S. Freeman, and C. Wood. 1992. Vicariance biogeography in the Pleistocene and speciation in North American wood warblers: A test of Mengel's model. *Proceedings of the National Academy of Sciences, USA* 89: 6624-6628.

Langston, N.E., S. Freeman, S. Rohwer, and D.Gori. 1990. The evolution of female body size in red-winged blackbirds: the effects of timing of breeding, social competition, and reproductive energetics. *Evolution* 44: 1764-1779.

Freeman, S. 1990. The evolution of the scrotum: A new hypothesis. *Journal of Theoretical Biology* 145: 429-445.

Freeman, S. and W.M. Jackson. 1990. Univariate metrics are not adequate to measure avian body size. *Auk* 107: 69-74.

Freeman, S., D.F. Gori, and S. Rohwer. 1990. Red-winged blackbirds and brown-headed cowbirds: some aspects of a host-parasite relationship. *Condor* 92: 336-340.

Rohwer, F.C. and S. Freeman. 1989. The distribution of conspecific nest parasitism in birds. *Canadian Journal of Zoology* 67: 239-253.

Ball, R.M., Jr., S. Freeman, F.C. James, E. Bermingham, and J.C. Avise. 1988. Phylogeographic population structure of red-winged blackbirds assessed by mitochondrial DNA. *Proceedings of the National Academy of Sciences, USA* 85: 1558-1562.

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Schultz, T.W., S.R. Freeman, and J.N. Dumont. 1980. Uptake, depuration, and distribution of selenium in *Daphnia* and its effects on survival and ultrastructure. *Archives of Environmental Contamination and Toxicology* 9: 23-40.