

Brian Avery

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Education

Ph.D. in Molecular and Cell Biology, Division of Genetics and Development – 2002
Laboratory of Gerald M. Rubin; University of California, Berkeley, California
Bachelor of Science in Biology, Magna Cum Laude – 1993
Tufts University, College of Arts and Sciences, Medford, Massachusetts

Teaching

Professor of Neuroscience, Biology, and Data Science

Westminster College Salt Lake City, UT – 2002 to present (Assistant from 2002-2007, Associate 2007-2013)

My teaching is very collaborative, active, and experiential with a focus on data gathering, data analysis, and reading and understanding primary literature. I have created many courses as well as large collections of lab and classroom activities.

- Routinely teach 3-4 classes a semester including: Stem Cells and Developmental Biology, Introductory and Advanced Cell Biology, Genetics, Neuroscience, Research Methods, and Science Liberal Education courses.
- Led redesign of Biology curriculum into a new four course core and wrote curriculum proposal in 2010.
- Co-founder and continued developer of the Interdisciplinary Neuroscience Program.
- Co-created and co-taught two research methods classes for the McNair Program.
- Created and taught: Advanced Molecular Genetics, Bioinformatics and Genomics, Chemistry and Biology of Brewing (co-taught), Molecular Modeling (co-taught), Behavioral and Neurogenetics courses.
- Taught a learning community pairing my Behavioral Genetics course with a colleague's Computer Science course as part of our AAC&U TIDES project as well as a second learning community pairing the same Behavioral Genetics course with a Probability course.
- Core Data Science Faculty (my third program affiliation).

Instructor

Department of Molecular and Cell Biology, UC Berkeley – Spring 2002

Primary instructor for the 5 week section on molecular techniques in the Genetics Lab for MCB majors (MCB 140L Genetics Laboratory).

Graduate Student Instructor

Department of Molecular and Cell Biology, UC Berkeley – 1999 to 2002

TA for General Biology and Developmental Biology undergraduate courses

Primary instructor of 2 seminars for junior and senior undergraduates

Undergraduate Teaching Assistant

Biology Department, Tufts University – Fall 1992

Research

Professor of Neuroscience, Biology, and Data Science

Westminster College – 2002 to present (Assistant from 2002-2007, Associate 2007-2013)

Over the years that I have been at Westminster, I have mentored dozens of undergraduate research students. Many of these students have continued their studies in graduate and professional programs. My students and I are interested in studying genetic diversity and how it affects the phenotypes of various organisms. For the last few years, we have concentrated on how different genotypes can affect complex behaviors in humans and the population genetics of the brine shrimp, *Artemia*, from Great Salt Lake in UT.

McNair Scholars Program

Westminster College – 2004 to present

I have mentored the independent summer research projects of several scholars and co-mentored several interdisciplinary group research projects in addition to teaching research methods classes in this program.

Ph.D. Candidate

Laboratory of Gerald M. Rubin, Department of Molecular and Cell Biology, UC Berkeley– 1997 to 2002

In collaboration with Bill Skarnes' lab, I examined the role of the fly LRP (dLRP) as well as two related mouse proteins, LRP5 and LRP6 in Wnt signaling and development. Including a yeast-two-hybrid screen with the intracellular domain of dLRP to identify new proteins that interact, and biochemical and functional assays in *Drosophila*, *Xenopus*, and *C. elegans* to characterize novel Wnt pathway proteins.

Senior Research Associate

Exelixis Inc., San Francisco, CA – 1995 to 1997

As the fourth full time employee of Exelixis, I participated in many early scientific decisions, helped set up operations, and gained valuable business experience. On a one year assignment, I traveled to the laboratory of Bill Skarnes in Edinburgh, Scotland, where I developed gene trapping in mouse ES cells, managed a gene trap screen, and made improvements to the technology.

Research Associate

ImmunoGen, Inc., Cambridge, MA – 1993 to 1995

I designed, engineered, expressed, and purified humanized antibodies and identified and characterized new molecules involved in programmed cell death.

Administrative and Committee Service

- WCore committee (liberal education) – 2017-present
- Griffin Gear-Up admitted first-year student advisor – 2016-present
- Undergraduate Research Committee – 2012-2016 (chair 2014-2016)
- Chair of Biology Program – January 2008 to June 2011, and July 2013 to August 2014
- Co-director of iFellows summer UGR program, Westminster College contact, and member of iUTAH management team for iUTAH NSF EPSCoR grant – 2011-2014
- Associate Director of Great Salt Lake Institute at Westminster College from founding in 2008 until Fall 2014
- Westminster College Strategic Planning Committee – 2012-2013
- Sustainability Task Force member – 2010-2015
- Westminster College Organic Garden Steering Committee member – 2008-2012
- Sabbatical Committee – 2008-2010 (chair 2010)
- Search Committees: Chemistry and Biology (2016); Neuroscience (2015); Math (2014, 2012); Chair of two Biology searches (2009); Biology/Environmental Studies (2006); one Math and two Psychology (2005); Math (2004)
- Teaching and Learning Resources Committee – 2006-2007
- Liberal Education Committee – 2003-2005

Consulting

- Advisor for Mayo Clinic medical student selective to learn programming in python (with Emma DeLoughery)
- GRE Biology Subject Test Committee – 2010-2016. The committee is responsible for test preparation.
- GRE Biology Subject Test question author and reviewer – 2007-2010.
- Science Content Consultant for stem cells curriculum development, 2010. Genetic Science Learning Center, University of Utah.
- Organizer and Science Content Consultant for Great Salt Lake Ecology Curriculum Development, 2008. Genetic Science Learning Center, University of Utah.
- Invited member of the Jordan School District Biotechnology Education Partnership Committee in 2009 and 2010.
- Invited member of the Genome Science for Health advisory committee and presented invited talks for NIH SEPA funded, master teacher training courses. Genetic Science Learning Center, University of Utah in 2006 and 2007.

Professional Development

- Naomi Weyher Leave, Spring Semester 2019: to pursue graduate level biostatistics training at the University of Utah.
- Southwest 3-day POGIL workshop, Colorado College, 2017.
- Software Carpentry Instructor Training: Portland, OR, May 4-5, 2017.
- Data Carpentry Curriculum Development Hackathon on Reproducible Research using Python and Jupyter: Berkeley Institute for Data Science, January 9-11, 2017.

- Courses in Mathematics and Statistics: Probability and Statistics (UofUtah); Multivariate Calculus, Data Visualization, Statistical Modeling, Linear Algebra, Structural Equation Modeling, Bayesian Data Analysis (Westminster); Applied Data Science with Python and Applied Plotting, Charting & Data Representation in Python courses (U of Michigan/Coursera); Statistics with R series (Duke/Coursera); ggplot2 and ggvis courses (DataCamp); R programming and Getting and Cleaning Data (Johns Hopkins/Coursera).
- Summer Institute on Statistical Genetics, Modules on Visualization of Biomedical Big Data, Quantitative Genetics, and Mixed Models in Quantitative Genetics, University of Washington, 2016.
- Henkels Teaching Fellowship (internal), awarded for summer professional development in scientific computing with Python, 2015.
- Summer Institute on Statistical Genetics, Modules on Population Genetic Data Analysis and Association Mapping, University of Washington, 2015.
- R workshop for faculty, Westminster College, 2014.
- AAC&U Transforming STEM Higher Education including TIDES workshop, 2014-2016.
- AAC&U TIDES summer institutes, 2014-2016.
- Northwest 3-day POGIL workshop, University of Puget Sound, 2014.
- Sustainability Faculty and Staff learning community, Westminster College, 2011-12.
- GMOD Summer School (https://www.nescent.org/courses/2010/gmod/Main_Page), 2010.
- New Perspectives on Teaching Introductory Biology Courses, NSF Chautauqua Short Course, Austin TX, 2003.

Grants (+=funded, x=not funded, p=pending)

- + Westminster College Gore Individual Summer Grant to develop probability and genetics book and materials (with B Bynum): 2018.
- + Westminster College Gore Math/Science Funds, Awarded for mentoring summer research with undergraduate students: 2003, 2005 to 2011, 2012(Keck Foundation), 2016, 2017.
- x NSF NRT proposal by University of Utah, Jim Ehleringer PI. Westminster contact to provide training and mentoring for PhD students interested in teaching careers: 2015.
- + Myriad Excellence in Learning Leadership Award (internal). PI. \$20,000 for continued population genetics research and professional development: 2015.
- + PKAL/AAC&U TIDES (Teaching to Increase Diversity and Equity in STEM). Co-PI. \$285,000 over three years to develop and implement classes and other student programs to increase diversity and equity in STEM with a focus on linking computer science and other STEM fields: 2014.
- + Dr. Ezekiel R. and Edna Wattis Dumke Foundation. co-PI. \$21,752 in support for the Interdisciplinary Neuroscience Laboratory at Westminster College: 2014.
- x NSF NRT proposal by University of Utah, Jim Ehleringer PI. Westminster contact and mentor to provide training for PhD students interested in teaching careers: 2014.
- x NIH BEST proposal by University of Utah, Kristen Keefe PI. Westminster contact and mentor to provide training for PhD students and post-docs interested in teaching careers: 2014.
- + NSF EPSCoR: iUTAH. Named as co-director of state-wide undergraduate research program and Westminster College appointee on iUTAH Management Committee: 2011.
- x NSF EPSCoR: iUTAH, 2010. Urban Transitions and Arid region Hydro-sustainability. One of four senior personnel for Human Infrastructure team, total budget \$20 million over 5 years, subcontract to Westminster College (Avery as PI) \$110,000+/year: 2010.
- x NOAA: THE UTAH ENVIRONMENTAL LITERACY FOR TEACHERS PROGRAM, One of four senior personnel, total budget \$1.5 million over 5 years, subcontract to Westminster College/GSLI \$13,800/year: 2010.
- x Utah Department of Natural Resources, Forestry, Fire and State Lands, Request for Proposals for Great Salt Lake Research: Development of a High-Resolution Melting Curve Method to Study the *Artemia* Population of Great Salt Lake: 2009.
- x DOE JGI Community Sequencing Program: Sequencing the single/low copy fraction of the genome of the brine shrimp, *Artemia*: 2009.
- x DOE JGI Community Sequencing Program: A Pilot *Artemia franciscana* Genome Project: 2005.

Awards

- Naomi Weyher Leave, Spring Semester 2019.
- Favorite Arts and Sciences Professor, Class of 2015.
- Merit Leave, Fall Semester 2007.
- Outstanding Graduate Student Instructor Award, 2000/01.
- National Science Foundation Graduate Fellowship, 1997 to 2000.
- Howard Hughes Medical Institute Fellowship For Undergraduate Research, Summer 1992.

Publications and Presentations

*Journal Articles (*undergraduate co-author)*

1. DeLoughery E*, Avery B, DeLoughery T. Retrospective study of rFVIIa, 4-factor PCC, and a rFVIIa and 3-factor PCC combination in improving bleeding outcomes in the warfarin and non-warfarin patient. *Am J Hematol*, 91(7):705-708, July 2016. <http://dx.doi.org/10.1002/ajh.24384>
2. Hu H, Avery BJ. CS Principles with POGIL Activities as a Learning Community. *Journal of Computing Sciences in Colleges*, 2015, 31(2), pp 79-86. <http://dl.acm.org/citation.cfm?id=2831444>
3. Hooker P, Deutschman W, and Avery B; The Biology and Chemistry of Brewing: An Interdisciplinary Course. *J. Chem. Educ.*, 2014, 91(3), pp 336-339. (cover) <http://pubs.acs.org/doi/abs/10.1021/ed400523m>
4. Riddle MR*, Baxter BK and Avery B; Molecular Identification of Microbes Associated with the Brine Shrimp *Artemia franciscana*. *Aquatic Biosystems*. 9:7 (8 March 2013) <http://www.aquaticbiosystems.org/content/9/1/7>
5. Baxter BK, Eddington B*, Riddle MR*, Webster TN*, and Avery BJ. "Great Salt Lake Halophilic Microorganisms as Models for Astrobiology: Evidence for Desiccation Tolerance and Ultraviolet Radiation Resistance." In Hoover RB, Levin GV, Rozanov AY, and Davies PCW. (eds.) *Instruments, Methods, and Missions for Astrobiology X*, 6694:669415. SPIE, Bellingham, WA, 2007.
6. Mitchell KJ, Pinson KI, Kelly OG, Brennan J, Zupicich J, Scherz P, Leighton PA, Goodrich LV, Lu X, Avery BJ, Tate P, Dill K, Pangilinan E, Wakenight P, Tessier-Lavigne M, Skarnes WC; Functional analysis of secreted and transmembrane proteins critical to mouse development. *Nat Genet*, 28(3):241-249, July 2001.
7. Pinson KI, Brennan J, Monkley S, Avery BJ, Skarnes WC; An LDL-receptor-related protein mediates Wnt signalling in mice. *Nature*, 28;407(6803):535-8, September 2000.
8. Townley DJ, Avery BJ, Rosen B, Skarnes WC; Rapid sequence analysis of gene trap integrations to generate a resource of characterised mutations in the mouse. *Genome Res.*, 7(3):293-8 March 1997.
9. Roguska MA, Pedersen JT, Henry AH, Searle SM, Roja CM, Avery B, Hoffee M, Cook S, Lambert JM, Blattler WA, Rees AR, Guild BC; A comparison of two murine monoclonal antibodies humanized by CDR-grafting and variable domain resurfacing. *Protein Engineering*, vol. 9, no. 10: 895-904, October 1996.
10. Boyd JM, Gallo GJ, Elangovan B, Houghton AB, Malstrom S, Avery BJ, Ebb RG, Subramanian T, Chittenden T, Lutz RJ, Guild BC; Bik, a novel death-inducing protein shares a distinct sequence motif with Bcl-2 family proteins and interacts with viral and cellular survival-promoting proteins. *Oncogene* 11: 1921-1928, November 1995.

Invited & Contributed Talks

1. Panelist for "What Universities Do (and Don't Do) to Influence (or not) Research Reproducibility", Build Research Integrity Through Reproducibility Conference, University of Utah, June 2018.
2. Avery BJ, Teaching Undergrads Research Reproducibility, Grand Rounds: Research Reproducibility. University of Utah, Eccles Health Sciences Library. October 2017.
3. Avery BJ, Clay CA. Teaching foundational quantitative and computational skills to early undergraduates using Jupyter Notebooks. ESA Annual Meeting 2017.
4. Avery BJ. Teaching foundational quantitative and computational skills to early undergraduates using Jupyter Notebooks. CSAIL 2017.
5. Avery B. Teaching quantitative and computational skills to undergraduates using Jupyter Notebooks. csv,conf, Portland, OR, May 2-3, 2017.
6. Avery B. Without learning to fail, we are failing to learn. Alpha Chi induction, November 2016.
7. Avery B. On the trail of mutant shrimp: Investigating the intrapopulation genetic diversity of the brine shrimp, *Artemia franciscana*, in Great Salt Lake. Southern Utah University, February 2014.
8. Avery B. The Population Genetics of *Artemia franciscana* in Great Salt Lake, Utah. Great Salt Lake Technical Advisory Group, Department of Wildlife Resources, State of Utah, March 2013.
9. Avery BJ and Peterson DP: Initial characterization of the large, repetitive genome of the brine shrimp, *Artemia*, by Cot filtration and Next Gen sequencing. Arthropod Genomics Workshop at Plant & Animal Genome XIX, January 2011.
10. Avery BJ. High-Resolution Melting as a Method to Discover and Study the Genetic Diversity of the Brine Shrimp (*Artemia*) Population of Great Salt Lake, Utah. Idaho Technology Workshop at Plant & Animal Genome XIX, January 2011.

*Conference Abstracts (*undergraduate co-author)*

1. Amburgey J, Avery B, Woods C, Graham C. Development of a Research Experience and an Undergraduate Course for Learning About Reproducibility Issues in the Behavioral and Neural Sciences. Build Research

- Integrity Through Reproducibility Conference, University of Utah, June 2018.
2. Winters C*, Sattler S*, Avery BJ. Molecular characterization and distribution of Cestode parasites that infect the brine shrimp of Great Salt Lake in Utah. Poster presented at ESA Annual Meeting 2017.
 3. Brown C*, Smith C*, Blasco C*, Perry T*, Hodgson R*, Avery B, Ellis L. BDNF Val66Met and differential processing of emotional stimuli in a Dot-Probe task. Talk presented by C Brown and C Smith at CSAIL 2017.
 4. Tobin J* and Avery B. Effect of Ca²⁺ signaling on Rho GTPases during neuroregeneration. Poster presented at 253rd American Chemical Society National Meeting, April 2017.
 5. Martinez V*, Ellis L, Avery B, Peralta Y*, and Hernandez D*. Attention, Brain Activity, the BDNF Gene and Anxiety. Poster presented at U of Washington McNair Spring Research Conference, May 2016.
 6. Martinez V*, Ellis L, Avery B, Peralta Y*, and Hernandez D*. Attention, Brain Activity, the BDNF Gene and Anxiety. Poster presented at ABRCMS, November 2015.
 7. Hu H, Avery BJ. CS Principles with POGIL Activities as a Learning Community. Rocky Mountain Conference of the Consortium for Computing Sciences in Colleges, October 2015.
 8. Edwards, HE* and Avery BJ. The Influence of Estrogen on Glutamate Transport Protein Genes in P19 Cell Derived Neural and Glial cells. Poster presented at ABRCMS, November 2014.
 9. Tackie-Yarboi E* and Avery BJ. DNA Based Identification and Prevalence of Cestode Parasites in the Brine Shrimp (*Artemia franciscana*) from Great Salt Lake, Utah. Poster presented at UCUR, February 2014.
 10. Tackie-Yarboi E* and Avery BJ. DNA Based Identification and Prevalence of Cestode Parasites in the Brine Shrimp (*Artemia franciscana*) from Great Salt Lake, Utah. Poster presented at ABRCMS, November 2013.
 11. Avery BJ, Doherty JG*, Roegiers AG*, Sheen RR*. A preliminary investigation of the intrapopulation genetic diversity of the brine shrimp, *Artemia franciscana*, in Great Salt Lake, Utah, at the mitochondrial COI locus by High Resolution Melting Analysis. Poster presented at the 98th Meeting of the Ecological Society of America, August 2013.
 12. Naylor ER*, Choles J*, Simonds J, Avery B, Costa R, and Ellis L. Variations in BDNF Val66Met Polymorphism and Inhibitory Processing Differentially Associate with the Valence of Imaginative Involvement. Poster to be presented at the 25th APS Annual Convention, Washington D.C., May 2013.
 13. Ellis LK, Choles JR*, Townsend MC*, Naylor ER*, Green DJ*, Avery BJ, Costa RE, Simonds J. Differential neural processing of negative stimuli in individuals experiencing facilitation vs. interference in an emotional Stroop task: Interaction with BDNF genotype. Cognitive Neuroscience Society, 20th Anniversary Meeting, San Francisco, CA. April 2013.
 14. Doherty JG* and Avery BJ. Exploring the Population Genetics of *Artemia franciscana* in Great Salt Lake, Utah. Poster presented at UCUR, February 2013.
 15. Ellis LK, Naylor ER*, Choles J*, Stevens B*, Avery B, Simonds J. Individual contributions of temperamental negative affect, negative life events, and BDNF Val66Met polymorphism to rumination. Paper presented at Occasional Temperament Conference, Salt Lake City, UT, January 2013.
 16. Townsend MC*, Bonebrake KM*, Della Iacono C*, Stevens BW*, Simonds J, Avery B. Differences in Self-Reported Temperament and Personality in Individuals Possessing the Val66Met Polymorphism of the BDNF Gene. Poster presented at Occasional Temperament Conference, Salt Lake City, UT, January 2013.
 17. Choles J*, Naylor E*, Rutisberger S*, Avery B, Costa R, Ellis LK, Simonds J. Orienting sensitivity by BDNF allele interaction in negative interference effects in an emotional Stroop task. Poster presented at Occasional Temperament Conference, Salt Lake City, UT, January 2013.
 18. Kilpatrick J*, Avery B and Deutschman WA: Identification of hop cultivars using high resolution melt curve analysis. ASBC World Brewing Congress, July 2012.
 19. Della Iacono C* and Avery B: Developing an Assay for Polymorphisms in the 5-HTT, DAT₁, and BDNF Genes to Determine Their Effects on Attention and Emotional Regulation. National Conference on Undergraduate Research, 2012.
 20. Avery BJ and Peterson DP: Initial characterization of the large, repetitive genome of the brine shrimp, *Artemia*, by Cot filtration and Next Gen sequencing. Poster presented at 4th Annual Arthropod Genomics Symposium, June 2010.
 21. Avery BJ, Sheen R* and Gillette K*: Development of a High-Resolution Melting Curve Method to Study the Genetic Diversity of the Brine Shrimp (*Artemia*) Population of Great Salt Lake, Utah. Poster presented at Plant & Animal Genome XVIII, January 2010.
 22. Paresi T* and Avery B: Regulation of Stress Gene Expression During Brine Shrimp Development and After Treatment with Selenium. 23rd National Conference on Undergraduate Research Poster, 2009.
 23. Avery BJ and Peterson DP: Cot-Based Cloning And Sequencing Of Single And Low Copy Number *Artemia* Genomic DNA Fragments. Poster presented at Plant & Animal Genome XVII, January 2009.
 24. Riddle MR*, Baxter BK and Avery B: Molecular Identification of Microbes Associated with the Brine Shrimp

- Artemia franciscana. 108th General Meeting of The American Society for Microbiology, June 2008.
25. Riddle MR*, Baxter BK and Avery B: Molecular Identification of Microbes Associated with the Brine Shrimp *Artemia franciscana*. International Society for Salt Lake Research Meeting, May 2008.
 26. Riddle MR*, Baxter BK and Avery B: Identifying the Microbes Associated with the Brine Shrimp, *Artemia franciscana*. Halophiles 2007 Poster, September 2007.
 27. Riddle MR*, Baxter BK and Avery B: Identifying the Microbes Associated with the Brine Shrimp, *Artemia franciscana*. American Society of Microbiologists Conference Poster, May 2007.
 28. Riddle MR*, Baxter BK and Avery B: Identifying the Microbes Associated with the Brine Shrimp, *Artemia franciscana*. National Conference for Undergraduate Research Poster, February 2007.
 29. Riddle MR*, Baxter BK and Avery B: Identifying the Microbes Associated with the Brine Shrimp, *Artemia franciscana*. Utah Conference for Undergraduate Research Poster, January 2007.
 30. Baxter BK, Acord M*, Riddle MR*, Avery B: Great Salt Lake Microbial Communities: The Foundation of a Terminal Lake Ecosystem. Eos Trans. AGU, 87(52), Fall Meet. Suppl., Abstract H52A-01. 2006.
 31. Larsen R* and Avery B: Thioredoxin Reductase in *Artemia* and its Role in Selenium Detoxification. 20th National Conference on Undergraduate Research April 2006.
 32. Avery BJ, Vroman S*, Larsen R*, and Rubin GM: An investigation of a network of protein interactions downstream of LRP proteins in mouse and *Drosophila* may also operate in *C. elegans*. 64th annual meeting of Society for Developmental Biology 2005.
 33. Avery BJ and Baxter BK: Integration of research projects in standard undergraduate courses as a strategy to teach analytical skills and increase faculty research productivity. 64th annual meeting of Society for Developmental Biology 2005.
 34. Avery BJ, Vroman S*, and Rubin GM: A conserved Network of protein interactions downstream of LRP proteins exists in mouse and *Drosophila*. 63rd annual meeting of Society for Developmental Biology 2004.
 35. Vroman S*, and Avery BJ: LRP protein-protein interactions in the fruit fly *Drosophila melanogaster*. National Conferences for Undergraduate Research 2003.
 36. Mure M, Avery BJ, Klinman JP: Cloning, characterization, and developmental expression of two lysyl oxidase like genes from *Drosophila melanogaster*. Quinone & Redoxactive Amino Acid Cofactors Gordon Research Conference, 2002.

Article Reviews

- Reviewed Manuscripts for the journal *Molecular Ecology*, 2008, 2011, 2012, 2014, twice in 2015, 2018.
- Reviewed *Principles of Development* text book, for Oxford University Press, 2013.
- Extensive review of *Papers, Proposals, and Presentations: Handbook of Scientific Communication* by A. Hofmann, for Oxford University Press, 2009.