CURRICULUM VITAE
AVA M. HOFFMAN

PROFESSIONAL DATA

Fred Hutchinson Cancer Center

Department of Biostatistics

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Pronouns: she/her/hers

Social Media

github: avahoffman

website: https://www.avahoffman.com

EDUCATION AND TRAINING

Ph.D. / 2019 – Colorado State University, Ecology

B.S. / 2012 – University of Virginia, Biology *with distinction*

Postdoctoral Training

2020–2021 Department of Earth and Planetary Sciences, Johns Hopkins University

PROFESSIONAL EXPERIENCE

Fred Hutchinson Cancer Center

Senior Staff Scientist, Department of Biostatistics (7/1/2022-present)

Johns Hopkins University

Faculty Associate, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health (7/1/2022-present)

Research Associate, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health (5/1/21–6/30/2022)

Postdoctoral Fellow, Department of Earth and Planetary Sciences, Johns Hopkins Krieger School of Arts & Sciences (3/23/20–4/30/21)

Other Professional Experience

Data Scientist, Boston Consulting Group (3/4/19–3/4/20), *data science-based consulting role working for corporate clients*

Data Science Fellow, Insight Data Science (9/10/18–3/4/19), *applied learning role building both technical products and career-focused community among fellows*

Laboratory Assistant, Biotechnology Division, DuPont-Pioneer (2012–2013)

Undergraduate Researcher, Department of Biology, University of Virginia (2011–2012)

Research Intern, United States Forest Service at Coweeta Hydrologic Laboratory LTER (2011)

Laboratory Assistant, Department of Biology, Virginia Commonwealth University (2010)

PROFESSIONAL ACTIVITIES

Society Memberships and Leadership

R–Ladies Baltimore, member (2020–present)

500 Women Scientists, pod member (2016–present)

Ecological Society of America, member (2012–present)

Women in Machine Learning and Data Science (Boston), member (2019–2020)

Front Range Student Ecology Symposium, Colorado State University, abstract review committee (2015–2016)

Front Range Student Ecology Symposium, Colorado State University, executive committee (2014–2015)

Front Range Student Ecology Symposium, Colorado State University, webmaster (2014–2015)

Graduate Degree Program in Ecology, Colorado State University, Journal Club founder and member (2014)

EDITORIAL AND OTHER PEER REVIEW ACTIVITIES

Peer Review

Journals: Agronomy, Environmental and Experimental Botany, Global Change Biology, Journal of Ecology, New Phytologist, Plant Biology, Plant Ecology, Plants, PloS One

HONORS AND AWARDS

Awards

Johns Hopkins Bloomberg School of Public Health Excellence in Teaching (2023 Winter Institute, 2022 Summer Institute, 2022 Winter Institute)

National Science Foundation Postdoctoral Research Fellowship in Biology (3/9/21, declined)

Colorado State University Research Mentoring to Advance Inclusivity in STEM Research Grant (1/1/18)

Colorado State University School of Global Environmental Sustainability Leadership Fellowship (9/1/17)

United States Department of Agriculture NIFA-AFRI Predoctoral Fellowship (1/1/17)

Colorado State University Graduate Degree Program in Ecology Travel Grant (4/4/16)

Colorado State University Graduate Degree Program in Ecology Research Grant (4/2/16)

City of Boulder Colorado Open Space and Mountain Parks Research Grant (3/1/2016)

Colorado State University Vice President of Research Graduate Fellow (2/29/16)

The Nature Conservancy J.E. Weaver Competitive Grant (2/10/16)

Colorado State University Department of Biology Harold Harrington Fellowship (4/10/15)

Colorado State University Department of Biology Stavros Family Fund Scholarship (4/10/15)

National Science Foundation Graduate Research Fellowship Program (Honorable mention, 3/31/14)

Colorado State University Department of Biology Sharon E. and David E. Kabes Scholarship (2014)

Colorado State University Department of Biology Graduate Fellowship Award (2013)

University of Virginia Undergraduate Research Travel Grant (2012)

PUBLICATIONS

Journal Articles (Peer Reviewed)

[22] Bushey, JA, **AM Hoffman**, TW Ocheltree, S Gleason, MD Smith. Water limitation reveals local adaptation and plasticity in the drought tolerance strategies of *Bouteloua gracilis*. *Ecosphere*. DOI: 10.1002/ecs2.4335

[21] Savonen, C, C Wright, **AM Hoffman**, J Muschelli, K Cox, FJ Tan, JT Leek (2022) Open-source Tools for Training Resources – OTTR. *Journal of Statistics and Data Science Education*. DOI: 10.1080/26939169.2022.2118646

[20] The Genomic Data Science Community Network (R Alcazar, M Alvarez, R Arnold, M Ayalew, LG Best, MC Campbell, K Chowdhury, KEL Cox, C Daulton, Y Deng, C Easter, K Fuller, S Tabassum Hakim, **AM Hoffman***, N Kucher, A Lee, J Lee, JT Leek, R Meller, LB Méndez, MP Méndez-González, S Mosher, M Nishiguchi, S Pratap, T Rolle, S Roy, R Saidi, MC Schatz, S Sen, J Sniezek, E Suarez Martinez, FJ Tan, J Vessio, K Watson, W Westbroek, J Wilcox, X Xie) (2022) Diversifying the Genomic Data Science Research Community. *Genome Research*. DOI: 10.1101/gr.276496.121

[19] Carroll, CJW, IJ Slette, RJ Griffin-Nolan, LE Baur, **AM Hoffman**, EM Denton, JE Gray, AK Post, MK Johnston, Q Yu, SL Collins, Y Luo, MD Smith, AK Knapp (2021) Is a drought a drought in grasslands? Productivity responses to different types of drought. *Oecologia*. DOI: 10.1007/s00442-020-04793-8

[18] **Hoffman, AM*** and MD Smith (2020) Nonlinear drought plasticity reveals intraspecific diversity in a dominant grass species. *Functional Ecology*. DOI: 10.1111/1365-2435.13713

[17] Knapp, AK, A Chen, RJ Griffin-Nolan, LE Baur, CJW Carroll, JE Gray, **AM Hoffman**, X Li, AK Post, IJ Slette, SL Collins, Y Luo, MD Smith (2020) Resolving the Dust Bowl paradox of grassland responses to extreme drought. *PNAS*. DOI: 10.1073/pnas.1922030117

[16] **Hoffman, AM***, JA Bushey, TW Ocheltree, MD Smith (2020) Genetic and functional variation across regional and local scales is associated with climate in a foundational prairie grass. *New Phytologist*. DOI: 10.1111/nph.16547

[15] Wilcox, KR, SE Koerner, DL Hoover, AK Borkenhagen, DE Burkepile, SL Collins, **AM Hoffman**, KP Kirkman, AK Knapp, T Strydom, DI Thompson, and MD Smith (2020) Rapid recovery of ecosystem function following extreme drought in a South African savanna-grassland. *Ecology*. DOI: 10.1002/ecy.2983

[14] **Hoffman, AM***, H Perretta†, NP Lemoine, and MD Smith (2019) Blue grama grass genotype affects palatability and preference by semi-arid steppe grasshoppers. *Acta Oecologia*. DOI: 10.1016/j.actao.2019.03.001

[13] Griffin-Nolan, RJ, D Blumenthal, S Collins, T Farkas, **AM Hoffman**, K Mueller, TW Ocheltree, MD Smith, AK Knapp (2019) Shifts in plant functional composition following long-term drought in grasslands. *Journal of Ecology*. DOI: 10.1111/1365-2745.13252

[12] Smith, MD, SE Koerner, AK Knapp, ML Avolio, FA Chaves, EM Denton, J Dietrich, DJ Gibson, J Gray, **AM Hoffman**, DL Hoover, KJ Komatsu, A Silletti, KR Wilcox, Q Yu, and JM Blair (2019) Mass ratio effects underlie ecosystem responses to environmental change. *Journal of Ecology*. DOI: 10.1111/1365-2745.13330

[11] **Hoffman, AM*** and MD Smith (2018) Thinking inside the box: Tissue culture for plant propagation in a key ecological species, *Andropogon gerardii*. *American Journal of*

*Indicates corresponding author
†Indicates a mentored student

Plant Sciences. DOI: 10.4236/ajps.2018.910144

[10] Knapp, AK, C Carroll, RJ Griffin-Nolan, IJ Slette, F Chaves, L Baur, AJ Felton, JE Gray, **AM Hoffman**, NP Lemoine, W Mao, A Post, MD Smith (2018) A reality check for climate change experiments: do they reflect the real world? *Ecology*. DOI: 10.1002/ecy.2474

[9] Griffin-Nolan, RJ, JA Bushey, CJW Carroll, A Challis, J Chieppa, M Garbowski, **AM Hoffman**, AK Post, IJ Slette, D Spitzer, D Zambonini, TW Ocheltree, DT Tissue, AK Knapp (2018) Trait selection and community weighting are key to understanding ecosystem responses to changing precipitation regimes. *Functional Ecology*. DOI: 10.1111/1365-2435.13135

[8] **Hoffman, AM**, ML Avolio, AK Knapp, MD Smith (2018) Co-dominant grasses differ in gene expression under experimental climate extremes in native tallgrass prairie. *PeerJ*. DOI: 10.7717/peerj.4394

[7] **Hoffman, AM*** and MD Smith (2017) Gene expression differs in codominant prairie grasses under drought. *Molecular Ecology Resources*. DOI: 10.1111/1755-0998.12733

[6] Avolio, ML, **AM Hoffman**, MD Smith (2017) Linking gene regulation, physiology, and plant biomass allocation in *Andropogon gerardii* in response to drought. *Plant Ecology*. DOI: 10.1007/s11258-017-0773-3

[5] Lemoine, NP, **AM Hoffman**, A Felton, L Baur, F Chaves, J Gray, Q Yu, MD Smith (2016) Underappreciated problems of low statistical power in ecological field studies. *Ecology*. DOI: 10.1002/ecy.1506

[4] Smith, MD, **AM Hoffman**, ML Avolio (2016) Gene expression patterns of two dominant tallgrass prairie species differ in response to warming and altered precipitation. *Scientific Reports*. DOI: 10.1038/srep25522

[3] Mellor, KE, **AM Hoffman**, MP Timko (2012) Use of ex vitro composite plants to study the interaction of cowpea (*Vigna unguiculata* L.) with the root parasitic angiosperm *Striga gesnerioides*. *Plant Methods*. DOI: 10.1186/1746-4811-8-22

[2] **Hoffman, AM*** (2012) Estimating tree transpiration accurately depends on wood type and species: a study of four southern Appalachian tree species. *The Oculus*. https://issuu.com/theoculus/docs/spring2012

[1] Zinnert, JC, JD Nelson, **AM Hoffman** (2011) Effects of salinity on physiological responses and the photochemical reflectance index in two co-occurring coastal shrubs. *Plant & Soil*. DOI: 10.1007/s11104-011-0955-z

Articles, Editorials and Other Publications Not Peer Reviewed

Zinnert, JC, JD Nelson, JK Vick, **AM Hoffman**, DR Young (2010) Rethinking chlorophyll responses to stress: Fluorescence and reflectance remote sensing in a coastal environment. Proceedings of the 4th International Workshop on Remote Sensing of Vegetation Fluorescence, Valencia, Spain.

PRACTICE ACTIVITIES

Presentations to Policymakers, Communities, and Other Stakeholders

Front Range Open Space Research Symposium (Boulder, CO, 4/11/17): Phenotypic diversity within dominant blue grama grass across an aridity gradient

SOFTWARE AND TEMPLATES

GitHub Templates

Online Tools for Training Resources (OTTR) Template - *A GitHub template that simplifies and accelerates publishing course content in bookdown format or to Leanpub and Coursera. Created with Candace Savonen, Carrie Wright, and others.* [Available on GitHub]

AnVIL Template - *A GitHub template variation of the OTTR Template that automatically formats and generates content specific to the AnVIL Project. Created with Katherine Cox.* [Available on GitHub]

Software & Tools

DMS Helper - *A text tool for helping Fred Hutch researchers and others create their NIH Data Sharing Plan.* [Available at dmshelper.fredhutch.org]

AnVIL Collection - *An automatically generating resource documenting all completed AnVIL and GDSCN content.* [Available on GitHub]

DaSL Collection - *An automatically generating resource documenting all completed Data Science Lab content.* [Available on GitHub]

Fred Hutch Letterhead - *A LaTeX template for Fred Hutch-themed letterhead.* [Available on GitHub]

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PART II

TEACHING

Capstone Advisees

Robotham, Daniel J., B.S. in Biological Sciences with Honors, Colorado State University (presented 5/15/15)

Thesis Title: Determining the effects of water stress on co-occurring native *Andropogon gerardii* and exotic (*Bothriochloa bladhii*) C4 grasses

Research Advisees

Postdoctoral Fellows

Humphries, Elizabeth, Johns Hopkins University and Fred Hutchinson Cancer Center (2022–present)

Nwigwe, Ifeoma, Johns Hopkins University (2022–present)

Master's Students

Nwigwe, Ifeoma, Master's of Public Health Student Research Assistant, Johns Hopkins University (2022)

Alaku, Chinemeihe, Master's of Public Health Student Research Assistant, Johns Hopkins University (2022)

Zaman, Fatima, Master's of Public Health Student Research Assistant, Johns Hopkins University (2022)

Undergraduate Students

Rodriguez, Natalie, Research Assistant, Johns Hopkins University (2021)

Swall, Madeleine, Student Researcher and Research Mentoring to Advance Inclusivity in STEM mentee, Colorado State University (2018)

Perretta, Holly, REU Student Researcher, Colorado State University (2016–2017)

Lock, Abigail, Research Assistant, Colorado State University (2017)

Gaudrealt, Brigitte, Research Assistant, Colorado State University (2016)

Magbual, Brianna, Research Assistant, Colorado State University (2014–2015)

Brown, Destiny, Research Assistant, Colorado State University (2014)

Classroom Instruction – Instructor of Record

Johns Hopkins University

Introduction to `R` for Public Health Researchers

- 140.604.79 – Summer Institute 2023, enrollment: 40
- 140.604.73 – Winter Institute 2023, enrollment: 23
- 140.604.79 – Summer Institute 2022, enrollment: 41
- 140.604.73 – Winter Institute 2022, enrollment: 27
- 140.604.11 – Summer Institute 2021, enrollment: 33

Baltimore Community Data Science, an interdisciplinary Special Topics Course

- 140.604.73 – Spring 2022, enrollment: 11

Classroom Instruction – Teaching Fellow / Assistant

Colorado State University

Molecular and General Genetics (BZ 350), Recitation instructor (Fall 2016)
Community Ecology (ECOL 600), Recitation instructor (Spring 2016)
Foundations of Ecology (ECOL 505), Recitation instructor with class lectures (Fall 2015)
Molecular and General Genetics (BZ 350), Recitation instructor (Spring 2015)
Molecular and General Genetics (BZ 350), Recitation instructor (Fall 2014)

University of Virginia

Organic Chemistry Lab II (CHEM 2421), Laboratory instructor (Spring 2011)
Organic Chemistry Lab I (CHEM 2411), Laboratory instructor (Fall 2010)

Short Courses

Data Wrangling with R, University of Washington Summer Institute (2022, 2021)

Other Teaching

Tools for Applied Data Science Using Cloud-Based Platforms: Online workshop, Virtual Applied Data Science Training Institute (2023)

WDL 101: Using WDL Workflows on AnVIL: Online workshop (2022)

GDSCN Train the Trainer: SARS-CoV-2 on Galaxy: Online workshop (2022)

Data Visualization using R and ggplot: Guest lecture, Colorado State University (2016)

Educational Resources

Fred Hutch Data Science Lab (DaSL)

Created course materials for the research community:

- NIH Data Management and Sharing Policy Course: A course outlining new policy requires, places to share data, and how to deal with possible challenges associated with the policy. Created with Carrie Wright and others.
- Fred Hutch Cluster 101: A short course to get Fred Hutch researchers running on the Fred Hutch cluster quickly and efficiently.

Analysis Visualization and Informatics Lab-space (AnVIL) Project

Created course materials for users to understand and better leverage the AnVIL cloud computing platform for education and research, including:

- AnVIL: SRA Data: A guide for bringing Sequence Read Archive (SRA) data into AnVIL.
- AnVIL Epigenetics Introduction: An introduction to analysis of epigenetic data and epigenetics concepts on AnVIL. Created with Ifeoma Nwigwe.
- AnVIL Shorts: Learn about AnVIL in 2 Minutes: a series of two-minute videos for new users to quickly understand multiple concepts and personas on AnVIL.
- Getting Started on AnVIL: a series of step-by-step guides for setting up accounts focused on three personas: PIs, Analysts, and Consortia. Also includes custom videos created using JHU software packages.
- AnVIL Instructor Guide: a guide to help classroom instructors who are new to AnVIL set up their accounts and start developing content.

Genomic Data Science Community Network (GDSCN) Project

Created course materials for GDSCN faculty to use in their classrooms, including:

- Statistics for Genomics: Differential Expression: A set of lab modules in the R programming language for an introduction to differential gene expression.
- GDSCN Book: SARS with Galaxy on AnVIL: a series of resources for instructors to engage students in a cloud-based Galaxy activity on AnVIL, focused on SARS-CoV-2 variant detection. Includes instructional videos, background lectures for instructors to use in their own classes, and a student lab activity guide.
- AnVIL Workspace for GDSCN members to use to follow the SARS-CoV-2 variant activity.

RESEARCH GRANT PARTICIPATION

Current Support

Project Title: Implementing the Genomic Data Science Analysis, Visualization, and Informatics Lab-space (AnVIL) (U24HG010263-05)

Dates: 7/2018–6/2023

Sponsoring Agency: National Institutes of Health

Principal Investigator: Michael C. Schatz

Main Grant Objective: Create user-centered solutions for data access, analysis, and visualization that enable investigators across all levels of expertise to fully utilize genomic datasets while using existing tools ported to a powerful cloud based platform

Role: MPI

Project Title: EVO-LTER: Leveraging long-term ecological research in grasslands: facilitating collaborations between ecologists and evolutionary biologists (DEB-2110351)

Dates: 3/2022–2/2024

Sponsoring Agency: National Science Foundation

Principal Investigator: Meghan L. Avolio

Funding Amount: $99,933

Main Grant Objective: Facilitate collaborative workshop to foster more evolutionary and molecular work at NSF Long Term Ecological Research sites

Role: Co-PI

Past Support

Project Title: The Genomic Data Science Community Network (NIH/NHLBI 75N92020P00235)

Dates: 9/2020–8/2022

Sponsoring Agency: National Institutes of Health

Principal Investigator: Michael C. Schatz

Main Grant Objective: Facilitate the formation and empowerment of a collaborative network of faculty from historically underserved universities and colleges in genomic data science education and research

Role: Content Developer

Project Title: Collaborative Research: MSB-FRA: Alternative futures for the American residential macro systems (DEB-1836034)

Dates: 01/2017–12/2020

Sponsoring Agency: National Science Foundation

Principal Investigator: Meghan L. Avolio

Funding Amount: $90,963

Main Grant Objective: Reveal genomic population structure and phenotypic differences among urban weeds in North American cities

Role: Postdoctoral fellow / Project Manager

Project Title: CityCress: A plant model for genetic, phenotypic, and gene regulatory relationships in urban environments (NSF-2109727)

Dates: Award declined by PI

Sponsoring Agency: National Science Foundation

Principal Investigator: Ava M. Hoffman

Funding Amount: $216,000

Main Grant Objective: Sponsor postdoctoral fellow in development of a model plant system for understanding urban molecular ecology

Project Title: Drought Adaptation Within Dominant Rangeland Species: Can Genetic and Phenotypic Diversity Buffer Against Stress? (USDA 2017-67011-26072)

Dates: 01/01/2017-02/14/2019

Sponsoring Agency: USDA-NIFA-National Institute of Food and Agriculture

Principal Investigator: Melinda D. Smith

Funding Amount: $94,999

Main Grant Objective: Sponsor predoctoral fellow stipend and research on genetic and phenotypic diversity in key prairie grass

Role: Project Director / Applicant

ACADEMIC SERVICE

Executive Committee student member, Graduate Degree Program in Ecology, Colorado State University (7/1/15-6/30/16)

Faculty search committee student organizer, Department of Biology, Colorado State University (2015)

PRESENTATIONS

Scientific Meetings

Oral Presentations

Population genetics of weedy plant species in urban environments, Baltimore Ecosystem Study Annual Science Meeting (10/13/22)

Population genomics of managed and unmanaged weedy plant species in cities, Baltimore Ecosystem Study Annual Science Meeting (10/27/21)

Plastic prairie: Genetic diversity and local adaptation within blue grama grass, Ecological Society of America (8/7/18)

Dominant grasses in drylands: linking species and traits to global change in ecosystems, Front Range Student Ecology Symposium (2/14/18)

Phenotypic diversity within dominant blue grama grass across an aridity gradient, Ecological Society of America (8/8/17)

Phenotypic diversity within dominant blue grama grass across a precipitation gradient, Front Range Student Ecology Symposium (2/23/17)

Thresholds of drought response differ in a tallgrass prairie population, Ecological Society of America (8/10/16)

Genotypes of a tallgrass prairie species respond differently to drought, despite high plasticity within populations, Ecological Society of America (8/14/15)

Genotypes of a tallgrass prairie species respond differently to drought, despite high plasticity in populations, Front Range Student Ecology Symposium (2/25/15)

Poster Presentations

Gene expression reveals different drought response strategies in dominant dryland grass populations, Ecological Society of America (8/3-8/6/20, virtual)

Phenotypic diversity within dominant blue grama grass across an aridity gradient, Colorado State University Drought Symposium (10/11/17)

Gene expression in co-dominant prairie grasses: comparing transcriptomes using RNA-seq and de novo assembly, Ecological Society of America (8/15/14)

Composite plants: A novel method for gene screening in cowpea, Ecological Society of America (8/8/12)

Invited Seminars

Breaking down the drought portfolio in grasslands, Vice President Office of Research Symposium (2/15/16)

LaTeX: Introduction and tricks of the trade, GDPE Graduate Student Forum (10/7/15)

Predicting diversity: Old hypotheses, new critiques, and why you should be paying attention, GDPE Graduate Student Forum (2/18/15)

Within-population variation under drought in a tallgrass prairie species, Colorado State University Plant Supergroup (12/5/14)

ADDITIONAL INFORMATION

Personal Statement

My primary goal is to make data science and bioinformatic tools more accessible to diverse audiences by synthesizing across approaches, disciplines, and data sources. I aim to communicate across multiple domains, from academic publications to peer and community education and outreach, by developing reproducible and approachable educational resources and data science tools. I am particularly interested in empowering individuals to gain intuition for data that does not adhere to traditional norms or structure, especially in genetics research. I am also interested in integrating and developing the emerging field of environmental and ecological data science with public health initiatives. Overall, my broad, interdisciplinary background helps me approach problems holistically and serves to bring stakeholders and experts from multiple pathways together.

Keywords

Genomics, data tools, data literacy, education, population genetics, gene expression, evolution, ecology