Alison F. Feder

Contact

Foege Building S103
3720 15th Ave NE
Seattle, WA 98195

E-mail: affeder@uw.edu
Website: *https://federlab.github.io*
Pronouns: she/her

Appointments

2021- Assistant Professor, Department of Genome Sciences, *University of Washington*
2018-2021 Miller Fellow, Department of Integrative Biology, *University of California, Berkeley*
Hosts: Oskar Hallatschek & Monty Slatkin

Education

2013-2018 PhD, Biology, Stanford University, Stanford, CA
Advisor: Dmitri Petrov
2012-2013 MSc (by Research), Statistics, University of Oxford, Oxford, UK
Advisor: Gil McVean
2008-2012 BA, Mathematics, *summa cum laude*, University of Pennsylvania, Philadelphia, PA
Advisor: Joshua Plotkin

Research Funding

2022-2027 NIH Director's New Innovator's Award
2022-2024 Cystic Fibrosis Foundation Pilot and Feasibility Award
2022-2024 UW Cystic Fibrosis Research Development Program Pilot and Feasibility Grant
2022-2024 Gilead Research Scholars Program in HIV

Research Fellowships

2018-2021 Miller Fellowship [Website]
2017-2018 Stanford Center for Computational, Evolutionary & Human Genomics Fellowship [Website]
2016-2017 Gerald J. Lieberman Fellowship [Website]
Awarded yearly to twelve Stanford graduate students whose teaching, research and university service demonstrate potential for academic leadership.
2012-2017 National Science Foundation Graduate Research Fellowship [Website]
2012-2013 Thouron Award [Website]

Awards & Honors

2018 Milner Prize in Evolutionary Biology
2018 Samuel Karlin Prize in Mathematical Biology
2018 James F. Crow Early Career Researcher Finalist (Genetics Society of America)
2017 Gil Omenn Prize for the best article in evolutionary medicine published in the previous year
2015 Excellence in Teaching Award (Department of Biology, Stanford)
2014 Center for Computational, Evolutionary and Human Genomics Trainee Grant
2012 Penn Genome Frontiers Institute Excellence in Genomics Undergraduate Award
2012 Phi Beta Kappa (University of Pennsylvania)

Peer-Reviewed Publications (* denotes equal contributions)

12. M. Lewinsohn, T. Bedford, N. F. Müller*, **A. F. Feder*** (2023). State-dependent evolutionary models reveal modes of solid tumor growth. *In press at Nature Evology & Evolution.* [Biorxiv version]

11. **A. F. Feder**, K. Harper, C. J. Brumme, P. S. Pennings (2021). Understanding patterns of HIV multi-drug resistance through models of temporal and spatial drug heterogeneity. *eLife*, 10:e69032. [Link] [Highlight in Nature Ecology & Evolution]

10. **A. F. Feder**, P. S. Pennings, D. A. Petrov (2021). The clarifying role of time series data in the population genetics of HIV. *PLOS Genetics* 17(1): e1009050. [Link]

9. **A. F. Feder**, P. S. Pennings, J. Hermisson*, D. A. Petrov* (2019). Evolutionary dynamics in structured populations under strong population genetic forces. *(G3: GENES, GENOMES, GENETICS)* 9(10):3395-3407. [Link] [Highlight in 2019 G3 Spotlight issue]

8. R. S. Mehta, **A. F. Feder**, S. M. Boca, N. A. Rosenberg (2019). The relationship between haplotype-based F_{ST} and haplotype length. *Genetics* 213(1):281-295. [Link]

7. K. Theys*, **A. F. Feder***, M. Gelbart*, M. Hartl, A. Stern, and P. S. Pennings (2018). Within-patient HIV mutation frequencies reveal fitness costs of CpG dinucleotides, drastic amino acid changes and G $\rightarrow$ A mutations. *PLoS Genetics* 14(6): e1007420. [Link]

6. **A. F. Feder**, C. Kline, P. Polacino, M. Cottrell, A. D. Kashuba, B. F. Keele, S.-L. Hu, D. A. Petrov, P. S. Pennings*, and Z. Ambrose* (2017). A spatio-temporal assessment of simian/human immunodeficiency virus (SHIV) evolution reveals a highly dynamic process within the host. *PLoS Pathogens*, 13(5): e1006358. [Link]

5. B. A. Wilson*, N. R. Garud*, **A. F. Feder***, Z. J. Assaf*, and P. S. Pennings (2016). The population genetics of drug resistance evolution in natural populations of viral, bacterial and eukaryotic pathogens. *Molecular Ecology*, 25(1):42–66. [Link]

4. **A. F. Feder**, S.-Y. Rhee, S. P. Holmes, R. W. Shafer, D. A. Petrov*, and P. S. Pennings* (2016). More effective drugs lead to harder selective sweeps in the evolution of drug resistance in HIV-1. *eLife*, 5:e10670. [Link]

3. **A. F. Feder***, S. Kryazhimskiy*, and J. B. Plotkin (2014). Identifying signatures of selection in genetic time series. *Genetics*, 196(2):509–522. [Link]

2. **A. F. Feder**, D. A. Petrov, and A. O. Bergland (2012). LDx: estimation of linkage disequilibrium from high-throughput pooled resequencing data. *PLoS One*, 7(11):e48588. [Link]

1. K. E. Lohmueller, A. Albrechtsen, Y. Li, S. Y. Kim, T. Korneliussen, N. Vinckenbosch, G. Tian, E. Huerta-Sanchez, **A. F. Feder**, N. Grarup, T. Jørgensen, T. Jiang, D. R. Witte, A. Sandbæk, I. Hellmann, T. Lauritzen, T. Hansen, O. Pedersen, J. Wang, R. Nielsen (2011). Natural selection affects multiple aspects of genetic variation at putatively neutral sites across the human genome. *PLoS Genetics*, 7(10):e1002326. [Link]

Current Research Supervision *[R] rotation project*

2023- [*R*] Nashwa Ahmed, Molecular & Cellular Biology PhD student, *U. Washington*
2022- Yingnan Gao, Postdoctoral fellow, *U. Washington*
2021- Hunter Colegrove, Genome Sciences PhD student, *U. Washington*
Oral presentation award at AISES 2022, Genome Training Grant awardee
2021- Elena Romero, Genome Sciences PhD student, *U. Washington*
CROI Young Investigator Award 2023, Best graduate student poster at PEQG 2022, Statistical Genetics TG awardee
2020- Will Hannon, Molecular & Cellular Biology PhD student, *Fred Hutch* (J. Bloom lab)

Past Research Supervision *[R] rotation project*

2022 Dylan Clark, undergraduate researcher, *U. Washington*
Herschel & Caryl Roman Scholarship in Genetics
2022 [*R*] Alexander Robertson, Molecular & Cellular Biology PhD student, *U. Washington*
2022 [*R*] Laura Baquero Galvis, Molecular & Cellular Biology PhD student, *U. Washington*
2020-2023 Maya Lewinsohn, MSTP student (Genome Sciences), *U. Washington* (T. Bedford lab)
2020 Helen Sakharova, Comp. Biology PhD rotation student, *UC Berkeley* (O. Hallatschek lab)
2016 Michael Herschl, undergraduate student, *Stanford University* (D. Petrov lab)

Graduate committees

2022- Hunter Colegrove, Genome Sciences (Chair)
2022- Laura Baquero Galvis, Douletov lab, Molecular & Cellular Biology
2022- Rechel Geiger, Emerman & Malik labs, Molecular & Cellular Biology
2022- Timothy Yu, Bloom lab, Molecular & Cellular Biology
2022- Gabrielle Ferra, Harris & Dunham labs, Genome Sciences
2021- Cassia Wagner, Bedford Lab, Genome Sciences
2021- Elena Romero, Genome Sciences (Chair)
2021- William Hannon, Bloom lab, Molecular & Cellular Biology
2021-2023 Maya Lewinsohn, Bedford lab, Genome Sciences

Invited Presentations ^{v} *virtually*

2023 BIRS: The Mathematics of Microbial Evolution: Beyond the Limits of Classical Theory, Banff, Canada
2022^{v} City College London Department of Mathematics, London, UK
2022 Georgia Tech School of Biological Sciences Seminar, Atlanta, USA
2022 University of Michigan Molecular Mechanisms in Microbial Pathogenesis Training Grant Invited Speaker, Ann Arbor, USA
2022 PNRI Student/Postdoc Invited Seminar Series, Seattle, USA
2022^{v} University of Virginia Ecology and Evolutionary Biology Seminar, Charlottesville, USA
2022^{v} Mathematical Models in Ecology and Evolution, IHP Workshop, Paris, France
2022^{v} Carnegie Mellon - Pitt Program in Computational Biology, Pittsburgh, USA
2021^{v} NIH Laboratory of Viral Diseases, Bethesda, USA
2021^{v} Temporal Genomics Working Group
2021^{v} Miller Institute for Basic Research in Science, UC Berkeley, Berkeley, USA

Invited Presentations (continued) ^{v} *virtually*

2021^{v}	Quantitative Evolution, Phylogeny and Ecology: IHP Workshop, Paris, France
2021^{v}	Institute of Ecology & Evolution, University of Oregeon, Eugene, USA
2020^{v}	Ecology & Evolution Seminar, University of California, Davis, USA
2020	Department of Genome Sciences, University of Washington, Seattle, USA
2019	Department of Ecology & Evolutionary Biology, University of Chicago, Chicago, USA
2019	Department of Computational Biology, Cornell University, Ithaca, USA
2019	Science & Mathematics Seminar, University of Puget Sound, Tacoma, USA
2019	European Society of Evolutionary Biology, Turku, Finland
2019	Society of Molecular Biology & Evolution, Manchester, UK
2019	Trainee Invited Speaker Series, Arjun Raj Lab at Penn, Philadelphia, USA
2019	Science & Technology Seminar, Joint Genome Institute, Walnut Creek, USA
2019	Departmental seminar, University of San Francisco, San Francisco, USA
2018	Palo Alto Research Center, Palo Alto, USA
2018	Milner Prize Lecture, University of Bath, Bath, UK
2018	Systems Biology Seminar, Cancer Research UK Cambridge Institute, UK
2018	Ad hoc seminar, University of California, Davis, USA
2018	Institute for Disease Modeling Annual Symposium, Seattle, USA
2017	Center for Theoretical Evolutionary Genomics, University of California, Berkeley, USA
2017	Institute for Disease Modeling, Bellevue, USA
2017	Center for Inference and Dynamics of Infectious Disease, Fred Hutchinson Cancer Research Institute, Seattle, USA
2017	Omenn Prize talk at the International Society of Evolution, Medicine and Public Health, Groningen, Netherlands
2017	Program for Evolutionary Dynamics, Harvard University, Cambridge, USA
2016	"Darwin's Weekly" Seminar, University of Chicago, Chicago, USA

Contributed/selected presentations * *talk* † *poster*

2018	[*] Society for Molecular Biology & Evolution, Yokohama, Japan
2018	[*] James F. Crow Award finalist session at PEQG, Madison, USA
2018	[*] HIV Dynamics & Evolution, Leavenworth, USA
2017	[†] Gordon Research Conference: Microbial Population Biology, Andover, USA
2017	[*] Gordon Research Seminar: Microbial Population Biology, Andover, USA
2017	[*] Society for Molecular Biology & Evolution Annual Meeting, Austin, USA
2016	[*] International Society of Evolution, Medicine and Public Health, Raleigh, USA
2016	[*] International HIV Drug Resistance Workshop, Boston, USA
2016	[† †] Conference on Retroviruses and Opportunistic Infections (CROI), Boston, USA
2015	[†] Bio-X Interdisciplinary Initiatives Symposium, Stanford, USA
2015	[*] Society for Molecular Biology & Evolution Annual Meeting, Vienna, Austria
2015	[†] "Forecasting Evolution?" SFB 680 Conference, Lisbon, Portugal
2015	[*] Biomedical Computation at Stanford (BCATS), Stanford, USA
2011	[*] NIMBioS Undergraduate Research Conference at the Interface of Biology and Mathematics, Knoxville, USA
2011	[††] Society for Molecular Biology & Evolution Annual Meeting, Kyoto, Japan

Public Outreach

2019	Invited speaker at Nerd Nite East Bay, a general audience seminar series
2017	Finalist in Evolution Film Festival for "Intra-patient Simian-HIV drug resistance evolution: does blood tell the whole story?"
2016	Finalist in Evolution Film Festival for "Better drugs lead to harder sweeps in HIV-1"

Teaching

University:

Fall 2022	Guest lecture for UW Biology 481, *Experimental Evolutionary Ecology*
Fall 2015	Co-teacher for BioCore Exploration (3 hour course), 'Are we still evolving?' with L. Uricchio
Spring 2015	TA for Stanford Biology 143, *Evolution*
Spring 2014	TA for Stanford Biology 43, *Evolution, Ecology & Plant Biology*

High School:

2016	Guest lecturer, *Evolutionary genomics theory, application and you!* Stanford Pre-Collegiate Institute
2014-2016	Stanford Splash! Teacher Taught 6 one-session mini-courses to high school students (two each on mathematical/logical thinking, population genetics and statistics/probability).

Competitive travel support

2018	Young Investigator Travel Award from SMBE (Yokohama, Japan)
2016	International Society for Evolutionary Medicine and Public Health Travel Award (Durham, USA)
2016	CROI Young Investigator Scholarship (Boston, USA)
2015	Wellcome Trust Travel Award (for "Forecasting Evolution?" meeting, Lisbon, Portugal)
2013	Cargese Summer School in Quantitative Genetics Grant (Cargese, France)
2011	NiMBioS Undergraduate Conference Grant (Knoxville, USA)

Academic, Community & University Service

2023	Co-organizer of SMBE 2023 symposium on 'Evolutionary Approaches to understand cancer across scales' with R. Noble
2022-	Genome Sciences Seminar committee
2022	Genome Sciences Retreat organizer
2021	Williams Prize Committee
2020-2021	Miller Institute DEI Working Group
2019-2021	Miller Symposium Planning Committee
2018	Co-organizer of SMBE 2018 symposium on 'Intra-host evolutionary dynamics' with K. Xue
2016-2017	Department of Biology TA Mentorship Program mentor and program organizer
2014-2017	Stanford Bioscience Students Association new student Mentor
2014-2015	Mentored student writing NSF Graduate Research Fellowship application

Referee for American Society of Naturalists, eLife, Evolution, Genetics, Journal of Theoretical Biology, Molecular Biology and Evolution, Nature Ecology & Evolution, PCI Evolutionary Biology, PLOS Computational Biology, PLOS Genetics, PNAS, Trends in Cell Biology, Virus Evolution