

Alison F. Feder

Contact

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Pronouns: she/her

Appointments

2023- Affiliate Investigator, Public Health Sciences, *Fred Hutchinson Cancer Center*
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
2012-2013 MSc (by Research), Statistics, University of Oxford, Oxford, UK
2008-2012 BA, Mathematics, *summa cum laude*, University of Pennsylvania, Philadelphia, PA

Research Funding

2022-2027 NIH Director's New Innovator's Award [[Website](#)]
 1DP2CA280623-01, PI: Feder (\$1.5m DC)
2022-2024 Cystic Fibrosis Foundation Pilot and Feasibility Award [[Website](#)]
 PI: Feder (\$100k)
2022-2024 UW Cystic Fibrosis Research Development Program Pilot and Feasibility Grant [[Website](#)]
 PI: Feder (\$100k)
2022-2024 Gilead Research Scholars Program in HIV [[Website](#)]
 PI: Feder (\$130k)

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)

Pre-prints

14. E. V. Romero, **A. F. Feder** (2023). Elevated HIV viral load is associated with higher recombination rate *in vivo*. *bioRxiv* 2023.08.05.502978. [\[Link\]](#)

Submitted manuscripts (* denotes equal contributions, † co-corresponding authors)

13. I Yousaf*, W. W. Hannon*, R. C. Donohue, C. K. Pfaller, K. Yadav, R. J. Dikdan, S. Tyagi, D. C. Schroeder, W Shieh, P. A. Rota, **A. F. Feder**†, R. Cattaneo† (2023). Spatial analysis of measles virus brain spread reveals how a genome collective drove a lethal human disease.

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. *Nature Ecology & Evolution* 7, 581–596. [\[Link, New & Views, This Week in Evolution \(TWiEVO\)\]](#)
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 → 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. [\[Link\]](#)

Peer-Reviewed Publications (cont.) contributions)

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

2023-	Samuel Hart, Postdoctoral scholar, <i>U. Washington</i> (joint with K. Harris)
2023-	Iris Jia, Genome Sciences PhD student, <i>U. Washington</i>
2022-	Alex Robertson, MCB PhD student, <i>U. Washington</i> (joint with B. Kerr)
2022-	Yingnan Gao, Postdoctoral scholar, <i>U. Washington</i>
2022-	Dylan Clark, undergraduate researcher, <i>U. Washington</i>
2021-	Hunter Colegrove, Genome Sciences PhD student, <i>U. Washington</i>
2021-	Elena Romero, Genome Sciences PhD student, <i>U. Washington</i>
2020-	Will Hannon, Molecular & Cellular Biology PhD student, <i>Fred Hutch</i> (J. Bloom lab)

Past Research Supervision *[R] rotation project*

2023	<i>[R]</i> Nashwa Ahmed, Molecular & Cellular Biology PhD student, <i>U. Washington</i>
2022	<i>[R]</i> Laura Baquero Galvis, Molecular & Cellular Biology PhD student, <i>U. Washington</i>
2020-2023	Maya Lewinsohn, MSTP student (Genome Sciences), <i>U. Washington</i> (T. Bedford lab)
2020	Helen Sakharova, Comp. Biology PhD rotation student, <i>UC Berkeley</i> (O. Hallatschek lab)
2016	Michael Herschl, undergraduate student, <i>Stanford University</i> (D. Petrov lab)

Graduate committees

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-	William Hannon, Bloom lab, Molecular & Cellular Biology
2021-2023	Maya Lewinsohn, Bedford lab, Genome Sciences

Invited Presentations *^v virtually*

2023	Computational Molecular Biology Retreat, Seattle, USA
2023	Statistical and Quantitative Genetics Symposium at UW Biostatistics, Seattle, USA
2023	Computational Biology (COMBI) seminar at UW, Seattle, USA
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

Invited Presentations (continued) ^v *virtually*

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
2021 ^v	Quantitative Evolution, Phylogeny and Ecology: IHP Workshop, Paris, France
2021 ^v	Institute of Ecology & Evolution, University of Oregon, 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	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

Contributed/Selected Presentations (continued) * *talk* † *poster*

- 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:*
- Spring 2023 UW Genome 373: Genomic Informatics (with J. Thomas)
 - 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).

Academic, Community & University Service

- 2023- Genome Sciences graduate program admissions committee
- 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, Virus Evolution

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)