JL Weissman

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Positions

Assistant Professor of Computational Biology, Schmid College of Science and Technology, Chapman University, Orange, CA, 2023 -

Postdoctoral Fellow, Department of Marine and Environmental Biology, University of Southern California, Los Angeles, CA, 2020 - 2022
Advisor: Jed A. Fuhrman

Education

Ph.D., Behavior, Ecology, Evolution, and Systematics (BEES; Fall 2019), University of Maryland College Park, College Park, MD
Investigating the Distribution of CRISPR Adaptive Immune Systems Among Prokaryotes
Advisors: Philip L.F. Johnson & William F. Fagan

Graduate Certificate, Computation and Mathematics for Biological Networks (COMBINE; Fall 2019), University of Maryland College Park, College Park, MD

B.A., Mathematics and Biology (Spring 2015), Bard College, Annandale-on-Hudson, NY
Modeling Stochastic Traps
Advisors: Csilla Szabo & Bruce Robertson

Summer Schools:

EMergent Ecosystem Responses to ChanGE Summer Program, EMERGE, NH, 2022
Microbial Diversity Course, Marine Biological Laboratory, Woods Hole, MA, 2018
The Search for Selection, NIMBioS, Knoxville, TN, 2018
Complex Systems Summer School, Santa Fe Institute, Santa Fe, NM, 2017
Quantitative Laws II, Lake Como School of Advanced Studies, Italy, 2016

External Funding

Simons Foundation Postdoctoral Fellowship in Marine Microbial Ecology ($246,100), Simons Foundation, 2020-2023
Drafting an Atlas of Prokaryotic Immune Strategy in the Global Oceans

Publications

Preprints:

1. Weissman J.L., M. Peras, T.P. Barnum, J.A. Fuhrman. **Benchmarking community-wide estimates of growth potential from metagenomes using codon usage statistics**. *bioRxiv*
2. Weissman J.L., E.R.O. Dimbo, A.I. Krinos, C. Neely, Y. Yagües, D. Nolin, S. Hou, S. Laperriere, D.A. Caron, B. Tully, H. Alexander, J.A. Fuhrman. **Estimating the maximal growth rates of eukaryotic microbes from cultures and metagenomes via codon usage patterns**. *bioRxiv*
3. Ignacio-Espinoza J.C., S. Laperriere, Y. Yeh, J.L. Weissman, S. Hou, M. Long, J.A. Fuhrman. **Ribosome-linked mRNA-rRNA chimeras reveal active novel virus host associations**. *bioRxiv*

Peer Reviewed:

1. Gleich S.J, J.A. Cram, J.L. Weissman, D.A. Caron. 2022. **NetGAM: Using generalized additive models to improve the predictive power of ecological network analyses constructed using time-series data**. *ISME Communications* 2(1), 23

2. Weissman J.L., S. Hou, J.A. Fuhrman. 2021. **Estimating maximal microbial growth rates from cultures, metagenomes, and single cells via codon usage patterns**. *Proceedings of the National Academy of Sciences* 118(12), e2016810118.
3. Weissman J.L., E.O. Alseth, S. Meaden, E.R. Westra, J.A. Fuhrman. 2021. **Immune Lag Is a Major Cost of Prokaryotic Adaptive Immunity During Viral Outbreaks**. *Proceedings of the Royal Society B* 288, 20211555.
4. Weissman J.L., ..., P.L.F. Johnson, D. Karig, W.F. Fagan, S. Bewick. 2021. **Exploring the functional composition of the human microbiome using a hand-curated microbial trait database.** *BMC Bioinformatics* 22(1), 1471-2105.
5. Tully B.J, J. Buongiorno, ..., L.E. Valentin-Alvarado, J.L. Weissman, BVCN Instructor Consortium. 2021. **The Bioinformatics Virtual Coordination Network: an open-source and interactive learning environment.** *Frontiers in Education* 6, 394.
6. Weissman J.L., A. Stoltzfus, E.R. Westra, P.L.F. Johnson. 2020. **Avoidance of Self During CRISPR Immunization.** *Trends in Microbiology* 28(7), 543-553.
7. Weissman J.L. & P.L.F. Johnson. 2020. **Network-Based Prediction of Novel CRISPR-Associated Genes in Metagenomes.** *mSystems* 5(1), e00752-19.
8. Martí-Carreras J., ..., J.L. Weissman, V. Zalunin, A. Efremov, B. Busby. 2020. **NCBI's Virus Discovery Codeathon: Building the "FIVE" – Federated Index of Viral Experiments API index.** *Viruses* 12(12), 1424.
9. Weissman J.L., W.F. Fagan, P.L.F. Johnson. 2019. **Linking high GC content to the repair of double strand breaks in prokaryotic genomes.** *PLOS Genetics* 15(11), e1008493.
10. Weissman J.L., R. Laljani, W.F. Fagan, P.L.F. Johnson. 2019. **Visualization and prediction of CRISPR incidence in microbial trait-space to identify drivers of antiviral immune strategy**. *The ISME Journal* 13(10), 2589-2602.
11. Bewick S., E. Gurarie, J.L. Weissman, J. Beattie, C. Davati, R. Flint, P. Thielen, F. Breitwieser, D. Karig, W.F. Fagan. 2019. **Trait-Based Analysis of the Human Skin Microbiome**. *Microbiome* 7(1), 101.
12. Weissman J.L., W.F. Fagan, P.L.F. Johnson. 2018. **Selective maintenance of multiple CRISPR arrays across prokaryotes**. *The CRISPR Journal* 1(6), 405-413.
13. Weissman J.L., R. Holmes, R. Barrangou, S. Moineau, W.F. Fagan, B. Levin, P.L.F. Johnson. 2018. **Immune Loss as a Driver of Coexistence During Host-Phage Coevolution**. *The ISME Journal* 12(2), 585-597.

Outreach Publications:

1. Weissman J. L., S. Hou, J.A. Fuhrman. **Using DNA to Predict How Fast Bacteria Can Grow**. *Frontiers Young Minds.*
2. Weissman J. L., H.H. Yiu, P.L.F. Johnson. 2019. **What Bacteria Do When They Get Sick**. *Frontiers Young Minds.*

Fellowships and Awards

COMBINE Network Science Fellowship ($35,859$, UMD/NSF DGE-1632976, 2018)
Devra Kleiman Memorial Scholarship ($2,500$, UMD, 2018)
GAANN Mathematical Biology Fellowship ($74,598$, UMD/U.S. Department of Education, 2015)
The Flagship Fellowship ($50,000$, UMD, 2015)
The Dean's Fellowship ($10,000$, UMD, 2015)
The Harry J. Carman Scholarship (Bard College, 2014)
The John Bard Scholarship (Division of Science, Math and Computing, Bard College, 2013)
George I. Alden Scholar (George I. Alden Trust, 2012)
The Excellence and Equal Cost Scholarship (Bard College, 2011)
The Bishop Scholarship (The Bishop Scholarship Foundation, 2011)

Invited Talks

1. Simons Collab. on Comp. Biogeochem. Modeling of Marine Ecosystems (CBIOMES), Aug 2021
2. Center for Advanced Biotechnology and Medicine, Rutgers University, NJ, May 2021

3. Department of Biology, San Diego State University, CA, May 2021
4. Center for Dark Energy Biosphere Investigations (C-DEBI), Apr 2021
5. Computation and Mathematics for Biological Networks (COMBINE), UMD, MD, Dec 2020
6. Department of Marine and Environmental Biology, USC, CA, Sept 2020
7. Environment and Sustainability Institute, University of Exeter, Penryn, UK, Feb 2019
8. Clemson University, Clemson, SC, Dec 2018

Teaching

Instructor, Qlife Quantitative Biology Winter School: Quantitative Viral Dynamics Across Scales, Département de Biologie, École normale supérieure, Paris, France, March 2022

Instructor, Bioinformatics Virtual Coordination Network, 2020-2021
`https://biovcnet.github.io/`

Guest Lecturer, University of Maryland College Park

- BIOL709F: Statistics and Modeling for Biologists, Spring 2018
- BSCI464: Microbial Ecology, Spring 2018
- BSCI405: Population and Evolutionary Genetics, Spring 2017

Teaching Assistant, Calculus for the Life Sciences, Department of Biology, University of Maryland College Park, Fall 2015

Teaching Assistant, Bridge to Enter Advanced Mathematics (BEAM), The Art of Problem Solving Foundation, Cambridge, MA, Summer 2012 and 2015

Mentoring

Workshop Organizer, *Mentoring Undergraduate Researchers: A Practical Guide for Graduate Student Mentors*, University of Maryland College Park, Spring 2019

Undergraduate Researchers Mentored ***(⋆coauthor, †presented at symposium or conference)***
University of Southern California:

Edward-Robert Dimbo⋆ (Winter 2021 - Summer 2022; GGURE)
James Rosas† (Summer 2021; National Summer Undergraduate Research Project, nsurp.org)
Yuniba Yagües⋆† (Summer 2020; National Summer Undergraduate Research Project, nsurp.org)
Oscar Escobedo† (Summer 2020; National Summer Undergraduate Research Project, nsurp.org)

University of Maryland College Park:

Rohan Laljani⋆† (Fall 2017 - Summer 2019)
Vinay Veluvolu† (Summer 2018 - Summer 2019)
Julia Gall† (Fall 2018 - Spring 2019; College Park Scholars)
Cori Butkiewicz (Summer 2017 - Spring 2018)
Nicholas Penn (Spring 2017 - Summer 2017)

Service

Session Co-Chair, Ocean Sciences Meeting, 2022

DEI Committee Member, Dept. of Marine and Environmental Biology (MEB), USC, 2021-2022

DEI Subcommittee on Reporting Member, MEB, USC, 2021-2022

Lead Organizer, MEB Statistics Reading Group, USC, 2020-2022

Judge, ASM Early Career Flash Talks, October 2021

Conference Organizing Committee, Holistic Bioinformatics Approaches Used in Microbiome Research, Bioinformatics Virtual Coordination Network, Summer 2020-Summer 2021

Co-Organizer, Pride Month Programming for MEB, USC, June 2021

Poster Judge, CRISPR 2021 Meeting, June 2021

Secretary-Treasurer, BEES Student Taskforce (BEESst), UMD-CP, Fall 2018-Spring 2019

Co-President, BEES Student Taskforce (BEESst), UMD-CP, Fall 2017-Spring 2018

Graduate Mentor, Biological Sciences Graduate Program, UMD-CP, Fall 2016, 2017

Reviewer: ISME J, PNAS, Current Biology, Nature Communications, mSystems, Microbiome, PLoS Comp Bio, Marine Genomics, npj Biofilms and Microbiomes, Proceedings B, BMC Bioinformatics

Outreach

Co-Organizer, Postdoc Outreach Project with LA Public Library, USC, 2020-2022
Project Mentor Terps in Space, 2017, 2018, 2022
Tutor & Mentor, Joint Educational Project, USC, Spring 2020
Lead Organizer, Frontiers Young Minds Writing Group, USC, Winter-Spring 2020
Panel Reviewer, Student Spaceflight Experiments Program (SSEP) 2016-2019
Maryland Day Organizer, Biological Sciences, UMD-CP, 2016-2018
Project Leader, Bard Math Circle, Annandale-on-Hudson, NY, 2013-2015
Public Talk, GradTerps Exchange, University of Maryland, Spring 2019
Public Talk, Skype a Scientist, Summer 2020

Conference Presentations *(*poster, †talk)*

Predicting maximal microbial growth rates from genomes and metagenomes for prokaryotes and eukaryotes

- Marine Microbes, Gordon Research Conference and Seminar, Switzerland, May 2022†*
- Fifth Workshop On Trait-Based Approaches to Ocean Life, Knoxville, TN, January 2022*

Estimating maximal microbial growth rates from cultures, metagenomes, and single cells via codon usage patterns

- Microbial Ecology & Evolution Virtual (MEEVirtual), online, August 2020*
- CBIOMES Annual Meeting, online, June 2020*

Linking selection for high GC content to repair of double strand breaks in prokaryotic genomes

- Microbial Population Biology, Gordon Research Conference and Seminar, NH, July 2019*

Ecology Shapes Microbial Immune Strategy: Temperature and Oxygen as Determinants of the Incidence of CRISPR Adaptive Immunity

- CRISPR Ecology and Evolution, the Royal Society, London, UK, February 2019*
- Microbial Eco-Evolutionary Dynamics, Instituto Gulbenkian De Ciência, Oeiras, Portugal, October 2018*

Is Having more than one CRISPR array adaptive?

- Microbial Population Biology, Gordon Research Conference and Seminar, NH, July 2017*

Immune Loss as a Driver of Coexistence During Host-Phage Coevolution

- Evolution in Philadelphia Conference (EPiC), UPenn, April 2017†
- Molecular Coevolution Workshop, Princeton Center for Theoretical Science, April 2016*