

EDUCATION

Ph.D., Biology

University of Utah, Salt Lake City, UT

Dissertation Title: Quantifying the Fitness Benefit of Learning

Advisor: Fred Adler

2021

B.A., Mathematics (minor in Journalism)

University of Nevada, Reno, NV

2008

ACADEMIC APPOINTMENTS

Postdoctoral Fellow

University of Pennsylvania, Philadelphia, PA

Advisors: Erol Akçay and Josh Plotkin

2022-Present

- Combining behavioral ecology and cognitive/social science approaches to understanding social behavior in humans and other organisms
- Applying collective behavior theory to the human dimensions of conservation

PUBLICATIONS

5. **Arehart, E.**; Reimer, J.R.; Adler, F.R. Strategy Sectors: Partitioning Environmental Parameter Space to Find Optimal Strategies. *In prep*^{*}.
4. **Arehart, E.**; Adler, F.R. A Minimal Model of Learning. *In prep*^{*}.
3. Meredith H.R., **Arehart, E***, Grantz, K*, ... Keegan, L.T. A coordinated strategy for a modeling-based decision support tool for COVID-19 in Utah, USA. *Emerging infectious diseases*, 27(5).
2. **Arehart, E.**; Jin, Tangxin; Daniels, B.C. Locating decision-making circuits in a heterogeneous neural network. *Frontiers in Applied Mathematics and Statistics*; 09 May 2018
1. Kuzma, H. A.; **Arehart, E.**; Louie, J. N.; Witzleben, J. L. The ear, the eye, earthquakes and feature selection: listening to automatically generated seismic bulletins for clues to differentiating between true and false events. *European Geophysical Union General Assembly Reports*; April 2012

* Indicates authors contributed equally; ^{*}Indicates manuscript available upon request

CONTRIBUTED PRESENTATIONS

Arehart, E. When does the ability to learn benefit foragers?

Invited Talk. Penn Symposium on Tools, Beliefs, and Behaviors, University of Pennsylvania May 2021

Arehart, E. Strategy Maps: How optimal foragers balance risk, reward, exploration, and learning

Invited Talk. MindCORE seminar series, University of Pennsylvania December 2020

Arehart, E. Quantifying the fitness benefit of sensory learning as a function of environmental complexity. Winner of the Alfred J. Lotka Prize.

Poster. Ecological Society of America Annual Meeting, Louisville, KY August 2019

Arehart, E. and Dentinger, B. Genome Sequencing and Population Genetics of an endangered Chilean mushroom, *Boletus loyo*

Poster. Environment & Sustainability Research Symposium, University of Utah February 2019

Kuzma, H.A.; **Arehart, E.** Listening to Seismic Events: Is the ear easier to train than the eye?

Poster. Comprehensive Test-Ban Treaty Organisation Science and Technology Conference, Vienna,

Austria

June 2011

Arehart, E. Mutating Math: Approaches to developing effective tools for modeling and solving in complex systems.

Invited Talk. Department of Geophysics, UC Berkeley

May 2009

GRANTS, FELLOWSHIPS AND AWARDS

- 2020 Mountaineer Fellowship for Graduate Research, University of Utah (\$14,000)
- 2020 3i (Immunology, Inflammation, and Infectious Disease) Seed Grant, Graduate Research Assistant – *Enhancing Transmission Models of COVID-19 with New Data Sources* (\$25,000)
- 2019 Alfred J. Lotka Prize for Best Theoretical Ecology Poster at Ecological Society of America conference
- 2018 Global Change and Sustainability Center Research Grant, Primary Investigator – *Conservation and Sustainability of Chile's Prized Wild Edible Mushroom, Boletus loyo*, (\$3,000)
- 2016 Global Change and Sustainability Center Fellowship, University of Utah (\$21,000)
- 2003 Nevada Millennium Scholar – full undergraduate scholarship, State of Nevada (\$32,000)

TEACHING EXPERIENCE

- Spring 2020 Teaching Assistant: Statistics for Biologists (Graduate Level), University of Utah (BIOL 6500)
- Spring 2019 Teaching Assistant: Urban Ecology (Graduate Level), University of Utah (BIOL 5440/CMP 6610)
- Fall 2018 Teaching Assistant: Entomology, University of Utah (BIOL 5445)
- Fall 2017 Teaching Assistant: Mycology, University of Utah (BIOL 5425)
- Fall 2017 Teaching Assistant: Mathematical Modeling for Biologists, University of Utah (BIOL 5910)

SELECT PROFESSIONAL EXPERIENCE

Graduate Research Assistant

2020

Project: *Enhancing Transmission Models of COVID-19 with New Data Sources*, 3i Seed Grant (L. Keegan, PI, University of Utah)

- Informed state policy as a member of Utah's COVID-19 modeling task force
- Using population genomic approaches to estimate cryptic transmission of COVID-19 in Utah

Graduate Research Assistant

2018-2021

Project: *Salivary Protein Influence on Taste and Feeding*, NIH Research Project Grant (A. M. Torregrossa, PI, SUNY Buffalo)

- Contributed to experimental design, performed power analyses, and grant writing
- Performed statistical analysis of data, extended results with mathematical models, and writing publication

Graduate Research Assistant

2017

Project: *How complex systems cope with noise: Balancing centralized and decentralized control*, Army Research Office Grant (F. R. Adler, PI, University of Utah)

- Surveyed literature on the generative role of stochasticity in biological systems, and how biological systems cope with incomplete information in uncertain environments

Consulting

2010-2016

Self-employed, Reno, NV and Austin, TX

I developed and implemented creative solutions to complex technical and business problems. Select projects:

- **Lab7.io**: Designed interface and wrote documentation for genomics pipeline platform
- **Genformatic LLC**: Consulted on security algorithm design for transmitting confidential genomic data

- **Comprehensive Test-Ban Treaty Organization:** Developed a novel auditory interface for discerning potential nuclear test events from earthquakes

Content Writer

Impact Mill (formerly eEcosphere), Austin, TX

2016

- Wrote articles about complex environmental topics for a general audience

Technical Writer

Spredfast, Austin, TX

2014

- Streamlined existing content, generated new documentation and developed support strategy for merging software companies. Projects completed in ¼ of allotted time.

Data Scientist

BetaZi Predictive Analytics, Truckee, CA

2011-2012

- Designed front- and back-end data flow, data processing, and user interfaces for statistical analysis software

Game Designer

International Game Technology (IGT), Reno, NV

2008-2010

- Designed and calculated math for casino games
- Led a diverse team of 20+ artists and engineers to develop and deliver games in record time

ACADEMIC SERVICE AND OUTREACH

2019-2020	Chair of the Graduate Student Advisory Committee, School of Biological Sciences, University of Utah
2019	Graduate Student Representative for School of Biological Sciences to SACNAS (Society for the Advancement of Chicano and Native American Students) Conference, Honolulu, Hawaii
2018-2019	Graduate Student Invited Speaker Organizer, School of Biological Sciences, University of Utah
2018-2019	Graduate Student Admissions Committee, School of Biological Sciences, University of Utah
2017	STEM Ambassador, University of Utah
2017	8 th Grade Science Fair Student Mentor, Salt Lake Center for Science Education
2017	Lead Instructor, Empowering Youth Through Stem Outreach, Glendale Public Library, Salt Lake City

FIELD EXPERIENCE

2019	Urban microbial survey (Stirling, Scotland) <i>Funded by Diageo Corporation</i> Surveyed mold and bacterial growth near industrial facilities in an urban/suburban area
2019	Loyo mushroom collecting expedition (Valdivia, Chile) <i>Funded by a Global Change and Sustainability Center Grant to E. Arehart, with additional support from the Natural History Museum of Utah</i> Collected specimens of a rare mushroom; used for first genome sequencing of the species, and data used to achieve IUCN Red List status for the species
2018	Collecting Expedition (Dja Preserve, Cameroon) <i>Funded by the University of Utah and Natural History Museum of Utah</i> Collected specimens in remote areas of Congo Basin rainforest

- 2017 **Beekeeping Documentary (Camaguey, Cuba)**
Funded by National Geographic – Young Explorer Grant to Adrian Curbelo Diaz
Consulted on beekeeping techniques and honeybee biology for a documentary film crew
- 2006-2007 **Wetland Restoration (Nevada)**
Otis Bay Ecological Consultants
Led amphibian and plant surveys on public and private wetland restoration sites, including Ash Meadows National Wildlife Refuge, Soldier Meadows, and McCarran Ranch

SELECTED TRAINING

- 2020 Workshop: Adaptive Management Tutorial, National Institute for Mathematical and Biological Synthesis, University of Tennessee, Knoxville, TN
- 2018 Workshop: Data-Driven Modeling of Collective Behavior, Mathematical Biosciences Institute, Ohio State University, Columbus, OH
- 2017 Workshop: Data-Driven Modeling of Collective Behavior and Emergent Phenomena in Biology, Statistical and Applied Mathematical Sciences Institute, Durham, NC

STUDENTS MENTORED

- Jake Baldauf (Brigham Young University, Summer 2020-Spring 2021)
Undergraduate Research Assistant, COVID-19 genomic epidemiology
- Morgan Kelley (University of Utah, Summer 2020)
Undergraduate Research Assistant, within-host viral selection
- Brendan Black (University of Utah, Fall 2018)
Undergraduate Research Project, cooperation and conflict in hematopoietic stem cells