EMERSON AREHART

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EDUCATION

Ph.D., Biology (Mathematical Biology) **2021**

University of Utah, Salt Lake City, UT
Dissertation Title: Quantifying the Fitness Benefit of Learning
Advisor: Fred Adler

B.A., Mathematics, minor in Journalism **2008**
University of Nevada, Reno, NV

PUBLICATIONS

5. **Arehart, E.**; Reimer, J.R.; Adler, F.R. Strategy Sectors: Analytical Methods for Partitioning Environmental Parameter Space and Finding Optimal Strategies. *In prep*†.
4. **Arehart, E.**; Adler, F.R. Quantifying the Fitness Benefit 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. *In review*†.
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. 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 assisted in writing grant
- Performing statistical analysis of data and extending results with mathematical models

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	8th 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)**
Funded by Diageo Corporation
Surveyed mold and bacterial growth near industrial facilities in an urban/suburban area

2019 **Loyo mushroom collecting expedition (Valdivia, Chile)**
Funded by a Global Change and Sustainability Center Grant to E. Arehart, with additional support from the Natural History Museum of Utah
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)**
Funded by the University of Utah and Natural History Museum of Utah
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)
  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