Austin J. Ferguson

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Education

Dual Ph.D. Computer Science & Engineering; Ecology, Evolutionary Biology, and Behavior
Advisor: Dr. Charles Ofria
Dissertation Title: An Empirical Analysis of Historical Contingency in Evolution
Michigan State University, East Lansing, Michigan — August 2018 - June 2024

Dual B.S. Computer Engineering Technology; Digital Simulation & Gaming Engineering Technology
Minor in Mathematical Science - Summa Cum Laude
Shawnee State University, Portsmouth, Ohio — August 2014 - May 2018

Professional Appointments

Assistant Professor - College of Computing
Grand Valley State University, Allendale, Michigan — August 2024 - Present

Peer-reviewed Journal Articles

Alexander Lalejini, **Austin J. Ferguson**, Nkrumah A. Grant, and Charles Ofria (2021). Adaptive Phenotypic Plasticity Stabilizes Evolution in Fluctuating Environments. Frontiers in Ecology and Evolution, Vol. 9.

Peer-reviewed Conference Publications

Austin J. Ferguson, Clifford Bohm, and Charles Ofria (2024). Predicting the Unpredictable: Using replay experiments to disentangle how evolutionary outcomes are altered by adaptive momentum. Proceedings of the 2024 Conference on Artificial Life, 69-77.

Austin J. Ferguson and Charles Ofria (2023). Potentiating Mutations Facilitate the Evolution of Associative Learning in Digital Organisms. Proceedings of the 2023 Conference on Artificial Life, 496-504.

Katherine G. Skocelas, **Austin J. Ferguson**, Clifford Bohm, Katherine Perry, Rosemary Adaji, Charles Ofria (2022). The Evolution of Genetic Robustness for Cellular Cooperation in Early Multicellular Organisms. Proceedings of the 2022 Conference on Artificial Life, 345-353.

Alexander Lalejini, Emily Dolson, Clifford Bohm, **Austin J. Ferguson**, David P. Parsons, Penelope Faulkner Rainford, Paul Richmond, and Charles Ofria (2019). Data Standards for Artificial Life Software. Proceedings of the 2019 Conference on Artificial Life, 507-514.

Peer-reviewed Extended Abstracts

Alexander Lalejini, **Austin J. Ferguson**, Nkrumah A. Grant, and Charles Ofria (2022). The evolution of adaptive phenotypic plasticity stabilizes populations against environmental fluctuations. (Article summary). Proceedings of the 2022 Conference on Artificial Life, 143-145.

Acacia Ackles, **Austin J. Ferguson**, Connor Grady, and Charles Ofria (2020). Rank-based epistasis: A new metric for understanding epistatis in the absence of quantifiable fitness interactions. Proceedings of the 2020 Conference on Artificial Life, 160-162.

Book Chapters

Austin J. Ferguson, Jose Guadalupe Hernandez, Daniel Junghans, Alexander Lalejini, Emily Dolson, and Charles Ofria (2020). Characterizing the Effects of Random Subsampling on Lexicase Selection. Genetic Programming Theory and Practice XVII.

Funding and Fellowships

GVSU Kindschi Undergraduate Research Fellowship (2024)
Marcos Sanson (undergraduate mentee), Austin Ferguson (PI).
Identifying Evolvability-Enhancing Mutations via Computational Models.
Awarded amount: $3,500

GVSU College of Computing Seed Funding (2024)
Erik Fredericks (PI), Alexander Lalejini (Co-PI), Austin Ferguson (Co-PI), Byron DeVries (Co-PI).
Research Experience for Undergraduates Intersecting Computing and Evolution.
Awarded amount: $23,000

BEACON Science and Technology Center Research Grant (2021)
Alternate Timelines: The Role of History in the Digital Evolution of Associative Learning..
Awarded amount: est. $45,000

BEACON Science and Technology Center Top-Up Fellowship (2018-2023)

MSU Engineering Distinguished Scholar (2018-2023)

Contributed Talks

Potentiating Mutations Facilitate the Evolution of Associative Learning in Digital Organisms
Authors: Austin J. Ferguson (speaker), Charles Ofria.
Presented at the 2023 Artificial Life Conference July 2023

Adaptive phenotypic plasticity stabilizes evolution in fluctuating environments.
Authors: Alexander Lalejini, Austin J. Ferguson (speaker), Nkrumah A. Grant, Charles Ofria.
Presented at the 2022 Artificial Life Conference July 2022
Presented at the ALife 2022 ERA workshop for the Outstanding Student Publication award July 2022

Seminar Presentations

Replay Experiments Demonstrate Changing Evolutionary Potential due to Adaptive Momentum
Presented at EEB symposium at MSU May 2024

Historical contingency, potentiation, and digital evolution (oh my!)
Presented at BEACON multi-lab meeting at MSU September 2023

What is digital evolution and what can it do?
Presented at CSE graduate seminar at MSU April 2023

Workshops

Co-organizer - Emerging Researchers in Artificial Life Workshop 2020-2021, 2023
Provided an opportunity for students, postdocs, and early-career researchers to learn about the group, present their research, and network in a low-stress environment.

Teaching and Mentoring Experience

Instructor - CIS-263 Data Structures and Algorithms (GVSU) Winter 2025

Instructor - CIS-241 System-level Programming and Utilities (GVSU) Fall 2024, Winter 2025

Instructor - CIS-351 Computer Organization (GVSU) Fall 2024

Teaching Assistant - CSE-491 Secure and Efficient C++ Software Development (MSU) Fall 2023
Co-designed the course with Dr. Charles Ofria. Assisted in all aspects of the course (e.g., creation of course materials, grading, daily class operation, etc.).

Teaching Assistant - CSE-431 Algorithm Engineering (MSU) Fall 2022
Assisted Dr. Emily Dolson by holding helproom hours, implementing an autograder in Gradescope, giving oral exams, and responding to student questions online.

Co-Instructor - Making a Game of IT (MSU) Summers 2021-2024
Taught an intense week-long Python programming fundamentals course to high school students through a game development lens.

Mentor - Mentored the following undergraduates at MSU:
Valdine Pegy Tchinda 2023 - 2024
Caroline Gormerly (co-mentored with Kate Skocelas) Fall 2020
Nicholas Lloyd (co-mentored with Alex Lalejini) Summer 2019
Daniel Junghans (co-mentored with Alex Lalejini) Summer 2019

Mentor - Workshop for Avida-ED Software Development (WAVES) Summers 2020 & 2021
Mentored workshop participants Dylan Rainbow (2020), Lanea Rohan, and Aria Killebrew-Bruehl (2021) in software development for Empirical and MABE2.

Supplemental Instructor - Shawnee State University Springs 2016 & 2017
Assisted professor Jason Witherell with ETGG1803: Concepts of 3D Graphics and Math. Held open lab hours where students could receive additional instruction on concepts and help on assignments.

Outreach & Service

Seminar Organizer - BEACON Center, MSU 2023 - 2024
Initiated, organized, and emceed a bi-weekly seminar on digital evolution.

Volunteer - BEACON Center, MSU 2019 - 2020, 2023
Attended "Science Nights" and Michigan State University's annual Science Festival to teach elementary-aged students about evolution through hands-on activities.

Elected General Chair - Emerging Researchers in Artificial Life 2022 - 2023
Tasked with overseeing all operations of the ERA board and ensuring smooth collaboration among members.

Elected Communications Chair - Emerging Researchers in Artificial Life 2020 - 2021
Managed social media for the group, served as the board's point of contact, and managed file-keeping for chair meetings.

Department Steward - Graduate Employees Union, MSU 2019 - 2020
Served as a main point of communication between the Computer Science & Engineering department and the graduate union at Michigan State University.

Senior Panelist - Gaming Department, SSU 2017 - 2018
Served on a panel answering any questions potential students and their families had about the gaming degree, Shawnee State University, and employment opportunities after graduation.

Volunteer Tutor - 14^{th} Street Community Center, Portsmouth, Ohio Fall 2015
Assisted elementary-aged students with homework understanding and oversaw downtime activities after work was completed.

Reviewer
Genetic and Evolutionary Computation Conference (GECCO) 2025 - Present
Artificial Life Conference 2021 - Present
BEACON Center grants 2020

Honors & Awards

2022 ISAL Award for Outstanding Student Publication	Summer 2022
Outstanding Senior in Computer Engineering, SSU	Spring 2018
Outstanding Senior in Digital Simulation and Gaming, SSU	Spring 2018
Outstanding Supplemental Instructor, SSU	Spring 2017
President's List, SSU	Fall 2014 - Spring 2017
Shawnee State Presidential Scholarship, SSU	Fall 2014 - Spring 2018
Margaret Gurney Noel Scholarship, SSU	Fall 2015 - Spring 2016
Centrus Energy Corporation Scholarship, SSU	Fall 2014 - Spring 2016
Ralph and Louise Arrick Scholarship, SSU	Fall 2014 - Spring 2015