Dissertation chapter information

Chapters 1 and 7 were written solely for this thesis. Chapters 2, 3, 4, 5, and 6 are adapted from work that has been published, work that has been accepted for publication, or work that will soon be submitted for review. Below, I document the origins of each individual chapter.

Chapter 1 – Introduction

The majority of this chapter was written exclusively for this dissertation with the exception of each chapter's associated summary in the Contributions subsection. Each of these summaries is adapted from the abstract of the paper associated with the given chapter.

Chapter 2 – The evolutionary origins of phenotypic plasticity

This chapter is adapted from a peer-reviewed conference paper published in the proceedings of the 2016 Artificial Life Conference (citation below). This publication is the result of my first research project as a graduate student at Michigan State University.

- **Author order:** *Alexander Lalejini*, Charles Ofria (advisor)
- **Citation:** Lalejini, A., & Ofria, C. (2016). The Evolutionary Origins of Phenotypic Plasticity. Proceedings of the Artificial Life Conference 2016, 372–379. https://doi.org/10.7551/978-0-262-33936-0-ch063
- **Contributions:** Lalejini and Ofria conceived the project and designed the experiments. Lalejini developed necessary experiment software, conducted experiments, analyzed the results, and drafted the manuscript. Lalejini and Ofria edited and refined the manuscript.

Chapter 3 – The evolutionary consequences of adaptive phenotypic plasticity

This chapter is adapted from a manuscript in preparation to be submitted to the 2021 Frontiers in Ecology and Evolution special issue on digital evolution.

- **Author order:** *Alexander Lalejini*, Austin J. Ferguson (student), Nkrumah A. Grant, Charles Ofria (advisor)
- **Working title:** The evolutionary consequences of adaptive phenotypic plasticity
- **Contributions:** Lalejini conceived the project. Lalejini and Ferguson designed the experiments, developed the necessary experiment software, conducted experiments, analyzed the results, and drafted the manuscript. Lalejini, Ferguson, Grant and Ofria edited and refined the manuscript. While the entire project was a collaborative effort, Ferguson took the lead on the genetic architecture analyses, and Lalejini took the lead on the evolutionary change, novel traits, and deleterious instruction analyses.

Chapter 4 – Evolving event-driven programs with SignalGP

This chapter is adapted from a peer-reviewed conference paper published in the proceedings of the 2018 Genetic and Evolutionary Computation Conference (citation below).

- **Author order:** *Alexander Lalejini*, Charles Ofria (advisor)
- **Citation:** Lalejini, A., & Ofria, C. (2018). Evolving event-driven programs with SignalGP. Proceedings of the Genetic and Evolutionary Computation Conference on - GECCO '18, 1135–1142. https://doi.org/10.1145/3205455.3205523
- **Contributions:** Lalejini led the conception, design, and development of SignalGP with advice from Ofria. Lalejini and Ofria designed the experiments. Lalejini developed the necessary experiment software, conducted the experiments, analyzed the results, and drafted the manuscript. Lalejini and Ofria edited and refined the manuscript.

Chapter 5 – Tag-based regulation of modules in genetic programming improves context-dependent problem solving

This chapter is adapted from a peer-reviewed article accepted for publication in the Genetic Programming and Evolvable Machines journal.

- **Author order:** *Alexander Lalejini*, Matthew Andres Moreno (student), Charles Ofria (advisor)
- **Citation:** Lalejini, A., Moreno, M. A., & Ofria, C. (to appear). Tag-based regulation of modules in genetic programming improves context-dependent problem solving. Genetic programming and Evolvable Machines.
- **Contributions:** Lalejini conceived of the project. Lalejini, Moreno, and Ofria designed the experiments. Lalejini and Moreno developed the necessary software. Lalejini conducted the experiments, analyzed the results, and drafted the manuscript. Lalejini, Moreno, and Ofria edited and refined the manuscript.

Chapter 6 – Tag-accessed memory for genetic programming

This chapter is adapted from a peer-reviewed extended abstract published in the companion proceedings of the 2019 Genetic and Evolutionary Computation Conference (citation below).

- **Author order:** *Alexander Lalejini*, Charles Ofria (advisor)
- **Citation:** Lalejini, A., & Ofria, C. (2019). Tag-accessed memory for genetic programming. Proceedings of the Genetic and Evolutionary Computation Conference Companion on - GECCO '19, 346–347. https://doi.org/10.1145/3319619.3321892
- **Contributions:** Lalejini led the conception, design, and development of tag-accessed memory with advice from Ofria. Lalejini designed the experiments, developed the necessary experiment software, conducted the experiments, analyzed the results, and drafted the manuscript. Lalejini and Ofria edited and refined the manuscript.

Chapter 7 – Conclusions

This chapter was written solely for this dissertation.