

# Roger Garcia

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CONTACT INFORMATION	Mississippi State University Department of Computer Science and Engineering 304 Butler Hall Box 9637 Mississippi State University, MS 39762	<i>Phone:</i> +1 (908) 906 - 4447 <i>Email:</i> rsg169@msstate.edu <i>Web:</i> rogersgarcia.github.io
EDUCATION	<p><b>Mississippi State University</b>, Starkville, Mississippi, USA</p> <p>Ph.D. Student, Computer Science</p> <ul style="list-style-type: none"><li>• Advisor: Christopher Archibald, Ph.D</li><li>• GPA: 3.79 / 4.0</li></ul> <p>Relevant courses: Data Science with R, Digital Systems in Engineering Education, Cryptography &amp; Network Security, Human-Computer Interaction, AI-Robotics, Artificial Intelligence, Algorithms for Artificial Intelligence and Machine Learning</p> <p><b>Kean University (NJCSTM)</b>, Union, New Jersey, USA</p> <p>M.S., Science and Technology, Computational Mathematics option</p> <ul style="list-style-type: none"><li>• Advisor: David Joiner, Ph.D</li><li>• Thesis Title: Extrasolar Planetary Dynamics with the Linear Laplace-Lagrange Secular Theory</li><li>• GPA: 3.70 / 4.0</li></ul> <p>B.S., Science and Technology</p> <ul style="list-style-type: none"><li>• Minor: Physics</li><li>• GPA: 3.39 / 4.0</li></ul> <p>Relevant courses: High Performance Computing, Knowledge Discovery and Data, Computer Programming, Operating Systems, Data Structures, and Software Engineering, as well as required coursework in Calculus, Differential Equations, Partial Differential Equations, Numerical analysis, and Statistics</p>	<p>June 2015 - Present</p> <p>May 2015</p> <p>May 2014</p>
TECHNICAL SKILLS	<p>Frequently used programming languages: Python, C/C++, R(Rstudio) and <math>\text{\LaTeX}</math></p> <p>Previously used programming languages: Matlab and Java</p> <p>Operating Systems: Linux and Microsoft Windows</p> <p>Software: ROS (Robot Operating System)</p> <p>Version Control: Git</p>	
PROFESSIONAL ACTIVITIES	<p>STEM Communication Club</p> <p><i>Vice-President</i></p> <p>Mississippi Machine Intelligence Collective</p> <p><i>AI-Group Member</i></p> <p>NASA Mining Robotics Competition</p> <p><i>Mississippi State Space Robotics Team</i></p> <p>Air Force Research Laboratory Collaboration Program, Dayton, Ohio</p> <p><i>Presentation: Unmanned Air Vehicle (UAV) Multi-Agent Coordination</i></p> <p>Frontiers in Applied and Computational Mathematics, Newark, New Jersey</p> <p><i>Thesis work at New Jersey Institute of Technology</i></p>	<p>2018 - Present</p> <p>2017 - Present</p> <p>2016 - 2017</p> <p>Sept 2016</p> <p>June 2015</p>

PROFESSIONAL EXPERIENCE	<b>Mississippi State University</b> , Starkville, Mississippi	May 2015 -
	<i>Graduate Research Assistant</i>	Sept 2018
	<i>Air Force Research Laboratory</i>	
	<ul style="list-style-type: none"> <li>• Use real-world geospatial database (OpenStreetMap) for generating graphs to evaluate K-RPP algorithms</li> <li>• Test performance of machine learning algorithms to reduce 20% of work on search</li> </ul>	
	<i>Pacific Northwest National Laboratory</i>	
	<ul style="list-style-type: none"> <li>• Testing for algorithmic efficiency from custom library</li> <li>• Topic modeling with R in high performance computing environment</li> </ul>	
	<b>Kean University</b> , Union, New Jersey	Sept 2014 -
	<i>Graduate Assistant for STEM-High Performance Computing</i>	May 2015
	<ul style="list-style-type: none"> <li>• Develop secular equations to explore effects induced on planetary systems (MATLAB)</li> <li>• Assisted faculty and students with Kean's cluster and CAVE visualization facility</li> <li>• Assisted students with tech support and laptop troubleshooting</li> </ul>	
	<b>Marshall University</b> , Huntington, West Virginia	June 2012 -
	<i>Research Intern</i>	Aug 2012
	<ul style="list-style-type: none"> <li>• Developed algorithm for the construction of mates of certain squares</li> <li>• Ran computational experiments with SSH and MPI library on (Big Green) cluster</li> </ul>	
	<b>University of Illinois</b> , Champaign, Illinois	June 2011 -
	<i>Research Intern</i>	May 2012
	<ul style="list-style-type: none"> <li>• Implemented a Document Object Model (DOM) to read files in XML format (C++)</li> </ul>	
TECHNICAL APPLICATIONS	<b>Forecasting Cryptodata</b> , Mississippi State University	Jan 2019 -
	<i>Data Science with R, Professor: Dr. J. Edward Swan II</i>	ongoing
	Project Overview: The goal is to find a dataset and go through all of the stages of <i>The Data Science Workflow</i>	
	Key highlights and deliverables:	
	<ul style="list-style-type: none"> <li>• Presentation and Written Report</li> <li>• Dataset: <code>crypto</code> package to get current and historical market data</li> <li>• Other packages: <code>"tidyverse"</code>, <code>"lubridate"</code>, <code>"tseries"</code>, <code>"forecast"</code> and <code>"highercharter"</code></li> <li>• Technical skills: R(Rstudio), R Markdown and L<sup>A</sup>T<sub>E</sub>X</li> </ul>	
	In this project, I developed skills essential to communicating insights gathered from the analysis of a dataset in the form of simple stories or visualizations. Furthermore, I learning the underlying structure and functions used in working with financial time series data in R. I will continue to analyze collected dataset beyond this project and findings will be share in Github	

**Accreditation for Informal Learning**, Mississippi State University Jan 2019 -  
*Dig Sys in Engineering Education, Professor: Dr. M. Jean Mohammadi-Aragh ongoing*  
 Project Overview: The goal is to conduct a literature review on blockchain driven works that aim to accredit informal learning

Key highlights and deliverables:

- Presentation and Written Report
- Technical skills: Python, Git and L<sup>A</sup>T<sub>E</sub>X

In this project, I am conducting a literature review that aims to map the full status of the *badge* movement and works that aim to accredit informal learning with the use of blockchain technology. Furthermore, I am developing a *literature tracker* in Python, essentially a database that tracks initial *.bib* references and updates variables that are used to input summary from papers such as *key idea, method, blockchain or informal learning related*. I will continue to code literature tracker and share code in Github

**Team HUMO**, Mississippi State University Aug 2018 -  
*Adv. Human-Computer Interaction, Professor: Dr. Cindy L. Bethel Dec 2018*  
 Project Overview: The goal was to incorporate hands-on design, programming and evaluation of an interface for real-world interactive technologies. The HUMO project was an unique opportunity to take part in since it set itself apart from the projects offered from a *top 100 logistic company*

Key highlights and deliverables:

- Presentations (*multiple checkpoints throughout semester*)
- Technical skills: Git, Qt Creator, Android Studio, User Design and User Experience

In this project, I had the opportunity to take part in preliminary work for designing the interface for HUMO, a team that focuses on *Alhlete Engineering from The Ground Up*. The core focus was on designing and prototyping an interface for displaying measure ankle range of motion, force data and total work per steps inferred from the data. This project allowed to collaborate and interact with individuals from a wide variety of disciplines and ultimately added value to my learning pursuit and personal growth

**Graduate Research Assistant**, Mississippi State University May 2016 -  
*AFRL: UAV Working Group, Supervisor: Dr. Christopher Archibald Sept 2018*  
 Project Overview: In this project, I took part in working on scheduling and path planning for UAVs (agents), specifically in the scenario (disaster-affected area) where we wanted to minimize the time it takes for exploring

Key highlights and deliverables:

- Presentation: *Unmanned Air Vehicle (UAV) Multi-Agent Coordination*
- Quartely Reports
- Technical skills: Git, Python, R(Rstudio), Pytorch and L<sup>A</sup>T<sub>E</sub>X

In this project, I had the opportunity to conduct research for the Airforce Research Laboratory Collaboration Program, in which I worked with R for extracting map information using *OpenStreetMap* package, coded clustering algorithms to compare performance to that of local search algorithms and explore the use of machine learning techniques for the development of an intelligent agent. This project allowed to collaborate and interact with individuals from a wide variety of disciplines and ultimately added value to my learning pursuit and professional growth

**Profiling Project**, Mississippi State University

Aug 2017 -

*Algorithms, Professor: Dr. Mahalingam Ramkumar*

Dec 2017

Project Overview: The goal was to develop algorithms and data structures for storing and querying dynamic (**key,value**) pairs and evaluate time and memory complexity vs number (**N**) of key-value pairs, as the database grows

Key highlights and deliverables:

- Presentation (*sorting algorithm*) and Written Report
- Technical skills: Python

In this project, I explored the use of different data structures (*Dict, Skiplist and Red-BlackTree*) in order to conduct a written report on the profiling time of insertion and query complexity. A random sequence generator was used to model the data and queries. As a result of this project, I was able to share my results and value the importance it is in choosing the right data structure, because not doing so may result in a negative impact on the performance for the problem in hand.

**Computational Billiards Agents**, Mississippi State University

Aug 2017 -

*Machine Learning, Professor: Dr. Christopher Archibald*

Dec 2017

Project Overview: The goal was to investigate and integrate machine learning techniques for the creation of a computational pool player (agent)

Key highlights and deliverables:

- Presentation and Written Report
- Technical skills: C/C++, Tensorflow and L<sup>A</sup>T<sub>E</sub>X

In this project, I took part in investigating different machine learning techniques that could be beneficial for the creation of a computational pool agent. In particular, with the use of *FastFiz*, a Physics library and simulator, and previous work on *CUECARD*, a computational billiards intelligent agent, we develop the construction of our agent by two different approaches: supervised learning and unsupervised learning with the goal of having our agent learn how to play billiards by itself and conduct a performance comparison to that of *CUECARD*.

**Q-Learning**, Mississippi State University

Jan 2017 -

*Algorithms for Artificial Intelligence, Professor: Dr. Eric Hansen*

April 2017

Project Overview: The goal was to develop an understanding of Q-learning and simulate algorithm

Key highlights and deliverables:

- Presentation
- Technical skills: Git and Python

In this project, I developed my understanding of Q-learning, a reinforcement learning technique used in machine learning. Based on previous work from multiple sources and **Tkinter**, an GUI toolkit, I explored the influence of parameters in different grid world sizes. I was able to share my own variant of Q-learning and have open discussion on the underlying structure of the algorithm. Developed code and presentation is shared on Github

PUBLICATIONS	PEER-REVIEWED RESEARCH PAPERS
	1 Megan Bryant, James Figler, Roger Garcia, Carl Mummert, and Yudhishtir Singh, The number of mates of latin squares of sizes 7 and 8, <i>Congressus Numerantium</i> , Vol. 217, pp. 53–64, 01, 2013. [ <a href="#">PDF</a> ]
AWARDS	
	<b>Alpha Chapter of Upsilon Pi Epsilon Honor Society in Computer Science</b> Mississippi State University, Mississippi, 2017
	<b>Louis Strokes Alliance for Minority Participation Scholar</b> Kean University, Union, New Jersey, 2013
	<b>New Jersey Center for Science, Technology and Mathematics Scholar</b> Kean University, Union, New Jersey, 2010
	<b>Ronald McDonald House Charities (RMHC/HACER) National Scholarship</b> Yankee Stadium, Bronx, New York, 2010
LANGUAGES	English and Spanish
CITIZENSHIP	USA
REFERENCES	<div> <div> Christopher Archibald, Ph.D  Computer Science and Engineering  Mississippi State University  archibald@cse.msstate.edu  +1 (662) 325-7500 </div> <div> David Joiner, Ph.D  NJ Center for Science, Technology and Mathematics  Kean University  djoiner@kean.edu  +1 (908) 737-7211 </div> </div>