Eric Khalil **Zacharia**

Data Science – Masters Student

774-239-5342 | ekzachar@uchicago.edu | ericzacharia.github.io | ericzacharia | ericzacharia

EDUCATION

University of Chicago | Chicago, IL | *M.S. in Computer Science, Specialization in Data Analytics* **December 2021**

- Courses: Machine Learning, Natural Language Processing, Advanced Data Analytics, Algorithms, Advanced Python, Databases, Applied Financial Technology, Web Development, Parallel Programming, Computer Systems, Discrete Math

Syracuse University| Syracuse, NY | *B.S. in Aerospace Engineering* **May 2016**

- Awards: George M. Berry Award for Outstanding Design Achievement in Engineering

SKILLS AND LANGUAGES

Proficient - Python, PyTorch, TensorFlow, Keras, Pandas, NumPy, SciPy, Scikit Learn, matplotlib, Jupyter, JSON, HTML5, CSS3, VSCode, PyCharm, Atom, MATLAB, LaTeX, Excel, PowerPoint, Word, Git Bash, Terminal, GitHub, Windows, Mac
Competent - SQL, Golang, Seaborn, Flask, NetworkX, JavaScript/ES6, Django, React, jQuery, PHP, Bootstrap

TECHNICAL RESEARCH & PROJECT EXPERIENCE

Programming Projects | Chicago, IL, Cambridge, MA, & Wichita, KS **June 2020 - present**

- **Machine Learning** - Implemented the following machine learning models from scratch in Python
  - Decision Tree learner and classifier with multiple split nodes and pruning, linear and logistic regressions with gradient descent, artificial neural network for MNIST dataset with forward and backward propagation and Xavier weight initialization, convolutional neural network with similar layers in addition to a convolutional layer supporting various strides and paddings and ReLU and max pooling layers, a support vector machine, and a random forest
- **Data Structures & Algorithms** - Implemented the following algorithms as object-oriented classes with methods in their base form, as well as methods relevant to their applications for solving common problems
  - AVL tree, Binary Search Tree, Binary Min Heap, BFS, DFS, Dijkstra, Prim, Kruskal, Ford-Fulkerson (Edmond-Karp), Randomized Quicksort, 3-Partition Quicksort, Merge Sort, LRU Cache, Open Addressing Hash Table
- **Concurrent Twitter Clone Feed** – Designed a Twitter feed that handles adding and removing posts to a linked-list feed using concurrent queue lock implementations in Golang
- **Slack Clone** - Created a single-page web application using asynchronous JavaScript and Flask that invited users to create an account using an email and password that would be salted, peppered, and hashed for secure storage in a database
  - Users can take advantage of the "forgot password" feature, change their username, change their password, create a new messaging channel, and reply to messages from other users within a channel
  - User account information and messages linked with their replies and channel information are stored in a database
- **Pinterest Clone** - Allowed users to create an ephemeral "mood board" using a Bing's image search API
- **Content Management System** - A web journal that supports posts from users and a comment system on those posts
- **Speaker Recognition System** - Compares scripts of text from two known speakers and one unknown speaker as input, and outputs the speaker who most likely spoke the unknown script. Implemented a hash-table and a Markov Model
- **Compiler for Jack Programming Language** - Compiles Jack programming language files into virtual machine files
- **Blob Video Game** - A video game called Blob. Inspired by the Snake Game and agar.io, Blob is always in motion, and dies when it runs off screen. Blob's radius increases with each smaller blob consumed, while evading the increasing number of poison pellets
- **Virtual Machine to Assembly Translator** - Translates virtual machine files into assembly language files
- **Text Completion Suggestions** - Repeatedly prompts the user for a prefix to complete based on an input text file. A set of words that complete the prefix are provided
- **Alpha Vantage Stock API – 20 Year Stock History Graph Generator** - Reads a stock symbol from the command line and graphs every date and closing price for the past 20 years
- **K-Letter Word Proportions – An Authorship Verification** - Prints the proportion of 1-letter, 2-letter, …, and 13+ letter words in an input text file. The proportions are compared to another text known to be written by the author to help verify if the input text is their work.
- **Roman Numeral to Arabic Number Converter** - Converts Roman Numeral strings to their Arabic number equivalents
- **Caesar Cypher Encryptor** - Encrypts and decrypts text files using the Caesar Cypher method

Entrepreneurial Project - Buy vs. Rent Calculator| Wichita, KS **November 2017 – January 2019**

- Designed a user-friendly spreadsheet calculator that shows a month-to-month profit comparison for one's current rental situation against their desired home purchase and sold a copy to a local brokerage firm
- Optimized the accuracy of the calculator with knowledge of the home buying experience, principle, interest, escrow, loans, taxes, utilities, closing fees, insurance options, inspections, agent fees, etc.

Fluid Dynamics Research - Hydrodynamics of Dolphin Caudal Fins | Syracuse, NY **June 2015 – May 2016**

- Studied the fluid dynamics and propulsive aspects of dolphin tails and experimented with 3D printed dolphin caudal fins that mimicked swimming motion inside a water tunnel
- Synthesized knowledge of MATLAB, Excel, SolidWorks (CAD), 3D printing, Arduino, planar laser-induced fluorescence, HD videography, aerodynamics, fluid dynamics, and electrical circuits
- Used fluorescent dye, highlighted with planar-shaped lasers, to outline trailing edge vortices, and created 3D vortex visualizations constructed on MATLAB using pixel data from the HD recordings of the 2D vortex sheets

Flight Competition - First Place Model Aircraft | Syracuse, NY **January 2016 – May 2016**

- Engineered with computer aided design software, stress tested with pressure sensors, and its aerodynamic efficiency measured with propeller shapes vs. battery drainage – the winningest six-foot model aircraft was built using a DC motor, balsa wood, composite materials, and cyanoacrylates with knowledge of aerodynamics, structural analysis, and 3D printing.

WORK EXPERIENCE

Spirit AeroSystems, Inc. | *Aerospace Stress Engineer, Structural Analysis* | Wichita, KS **August 2016 – August 2020**

- Worked on teams that designed, built, analyzed, and tested aerospace structures for The Department of Defense, Boeing's 787 Dreamliner, and Boeing's 777X; gained promotion to Level II Stress Engineer within 18 months
- Applied knowledge of MATLAB, Excel, linear algebra, ABD matrices, statics, dynamics, fatigue, damage tolerance, crack growth, Finite Element Analysis, Computer-Aided-Design, and properties of aluminum and composite materials

Glacier's Bed and Breakfast | *Airbnb Rentals - Super Host* | Wichita, KS **July 2018 – March 2020**

- Purchased a 3-bedroom home and became a self-employed Super Host by sustaining a 5-star rating with over 80 bookings

EXTRACURRICULARS & CERTIFICATIONS

Secret Government Security Clearance | Private Pilot | Open Water Scuba Diver | Learn to Ice Skate Instructor
Varsity Ice Hockey Coach | Alternate Captain, Syracuse University Roller Hockey